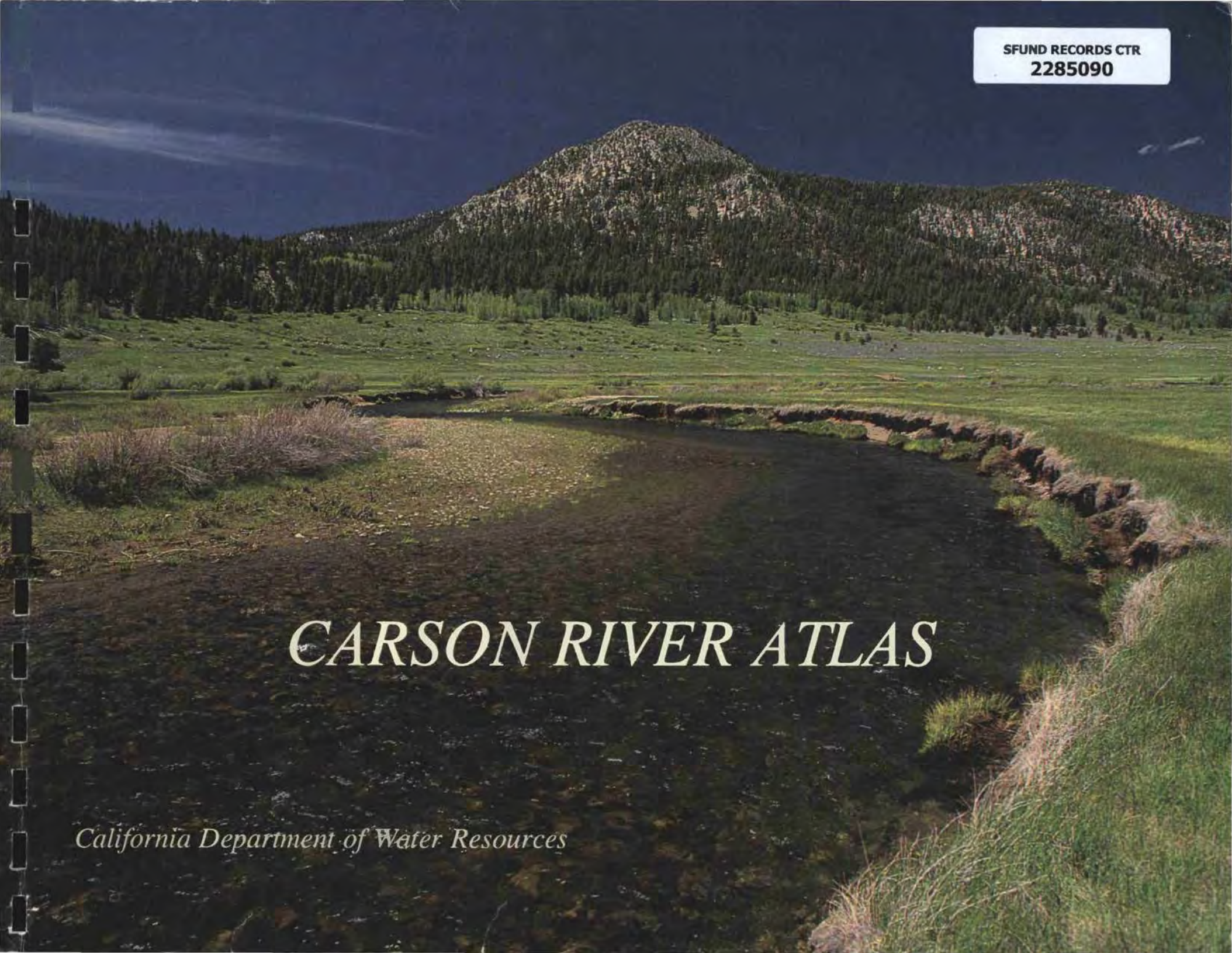
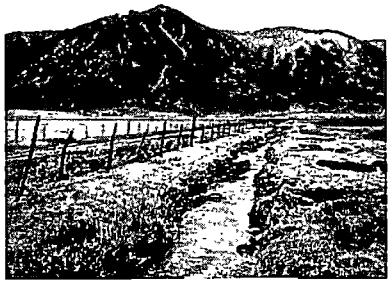


CARSON RIVER ATLAS

California Department of Water Resources

(Front Cover)
West Fork Carson River in Hope Valley, in the upper watershed.



(Back Cover)
Looking toward the Sierras in Diamond Valley, an area long irrigated from the Carson River.

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The Resources Agency
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Department of Water Resources
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State of California
The Resources Agency
DEPARTMENT OF WATER RESOURCES

CARSON RIVER ATLAS

December 1991

FOREWORD

The Carson River, shared between California and Nevada, has had a long history of water rights disputes that belies the river's relatively small size. This river has the distinction of being involved in one of the longest running federal district court water rights cases in the nation — a 55-year suit that led to the issuance of a 1980 decree that adjudicated most of the river's water rights.

More recently, the 1990 passage of the federal Truckee-Carson-Pyramid Lake Water Rights Settlement Act marks a milestone for the Carson River. Among other things, the act achieved an interstate allocation of the water resources, a goal that both California and Nevada have pursued for many years. The act also regulates the interstate transfer of water, and provides for purchase of water rights to support wetlands in Nevada.

This atlas is the result of information gathered by the Department of Water Resources during negotiation of the recent settlement legislation. The atlas provides background information for people interested in the historical conditions that have shaped present-day water uses and reviews some trends in the river basin's water resources management that will be important in the future.

David N. Kennedy
Director

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INTRODUCTION

The Carson River has its headwaters in California's high Sierras south of Lake Tahoe, and it terminates in a desert sink in western Nevada. This relatively small river — in places resembling more stream than river — is an important water source in arid western Nevada. Overshadowed by the Truckee River to the north and eclipsed by Mono Lake farther south, this eastern Sierra watercourse is a little known resource.

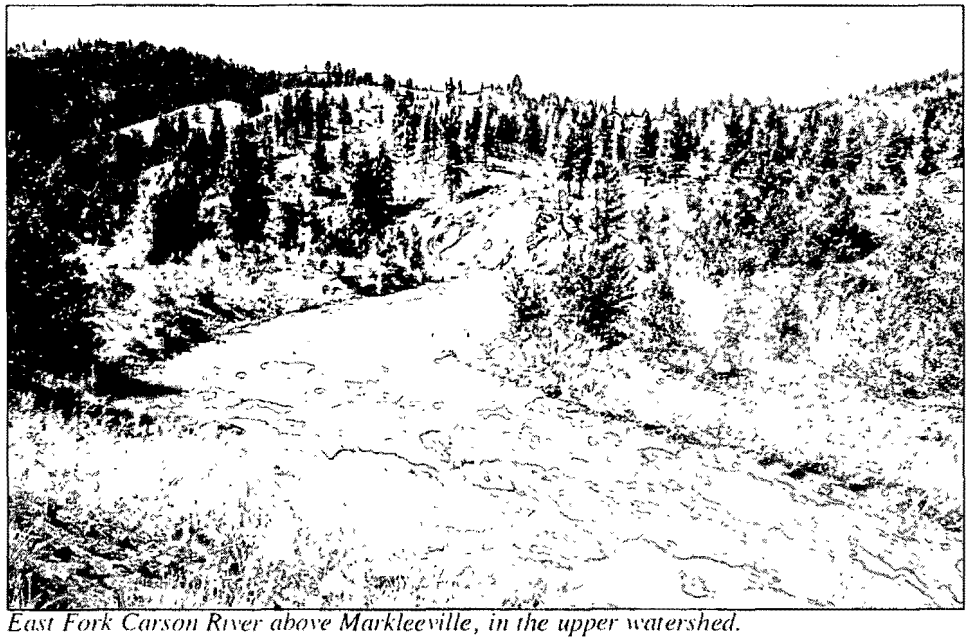
The upper watershed in California is perhaps most noted for its recreational opportunities. In contrast, the lower watershed, in Nevada's Carson Sink, is characterized by agricultural development created by a federal reclamation project. Lands adjacent to this agricultural area support wetlands habitat that comprises one of Nevada's most important wildlife refuge areas, extensively used by migratory waterfowl and shorebirds.

Water is a scarce commodity on the eastern slopes of the Sierras, and disputes over rights to use of Carson River water began early and were remarkable for their length. Water rights disputes were complicated by the river's interstate nature and by differences in the water rights administration laws of the two states. Attempts to make an allocation of the river between California and Nevada began in the 1950s; a milestone was recently achieved with the passage of federal legislation that laid a framework for the interstate allocation.

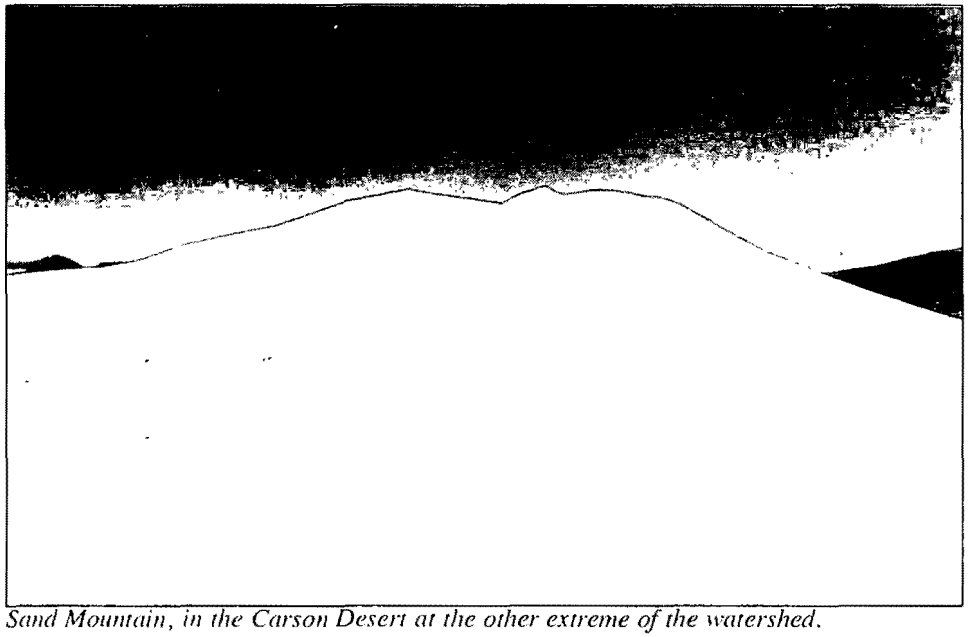
The first major water development in the Carson drainage area occurred in conjunction with the mining and lumbering boom of the 1860s. Fabled riches of the Comstock Lode were the impetus for both Nevada's statehood and its nickname as the "Silver State". The silver boom fostered development of water supplies for mining camps and the small towns that developed to provide supplies for the miners.

Today the waters of the Carson River and its tributaries support a variety of uses — providing municipal water supply, sustaining fish and wildlife habitat, generating hydroelectric power, furnishing river and reservoir recreational opportunities, and serving water for agriculture.

This atlas presents information gathered by the California Department of Water Resources as part of its work on the interstate water allocation issues. The intent of the atlas is to provide a brief introduction to characteristics of the river and its watershed for those not familiar with the region and to provide references for further information. Figure 1 shows the general location of the Carson River watershed; Figure 2 is a map of the watershed itself.



East Fork Carson River above Markleeville, in the upper watershed.



Sand Mountain, in the Carson Desert at the other extreme of the watershed.

Kit Carson

Christopher (Kit) Carson was a widely known figure on the western frontier. He accompanied John C. Fremont as a scout or guide during Fremont's explorations in the Sierras in the 1840s. Fremont's two expeditions in the region yielded the first maps of the area, together with descriptions of its geology and its flora and fauna. Many geographic features were named after members of Fremont's party. Kit Carson's name is memorialized in the Carson River, Carson Valley, Carson Pass, and Carson City.

Figure 1
LOCATION OF THE CARSON RIVER WATERSHED AND VICINITY

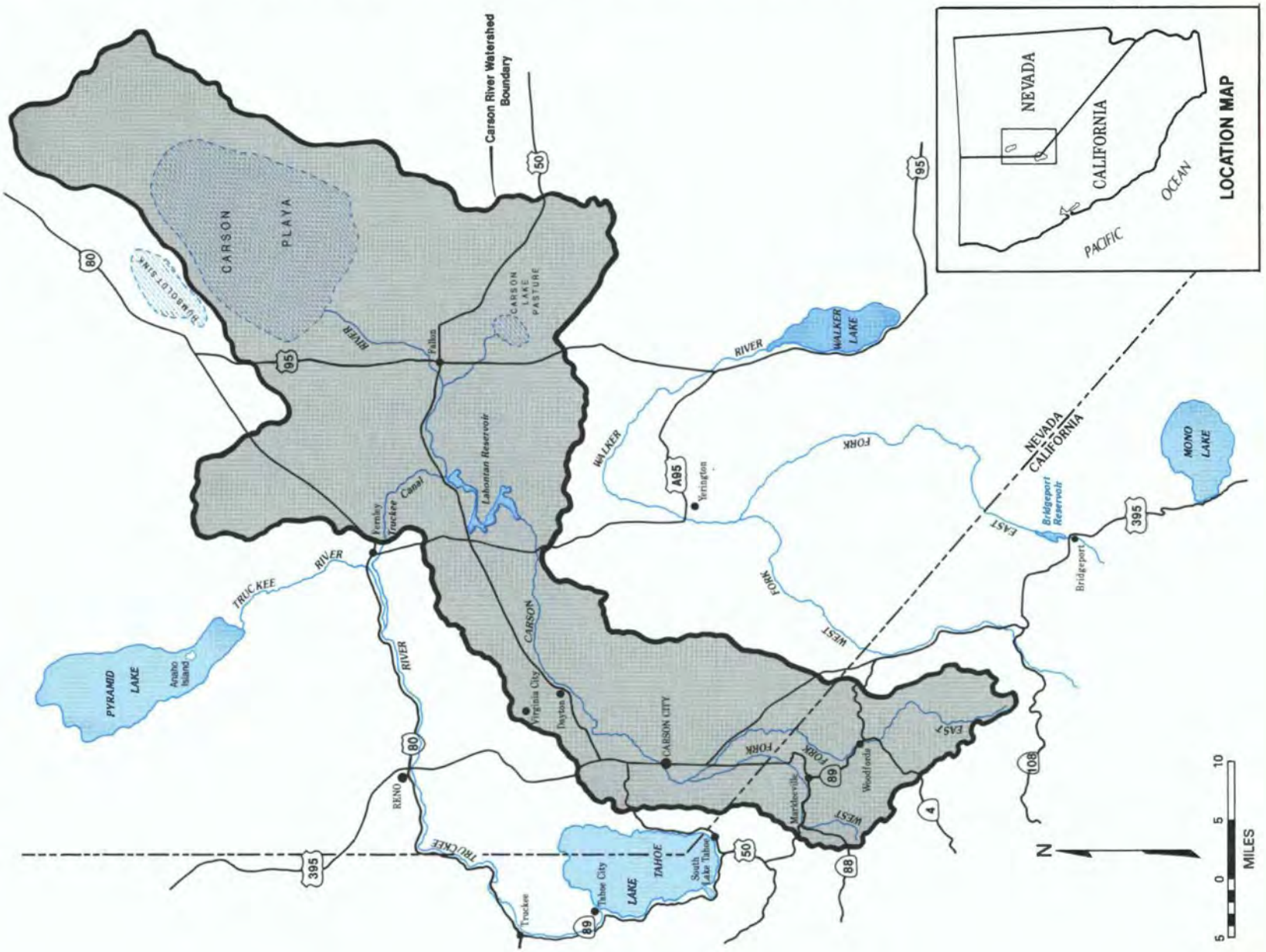
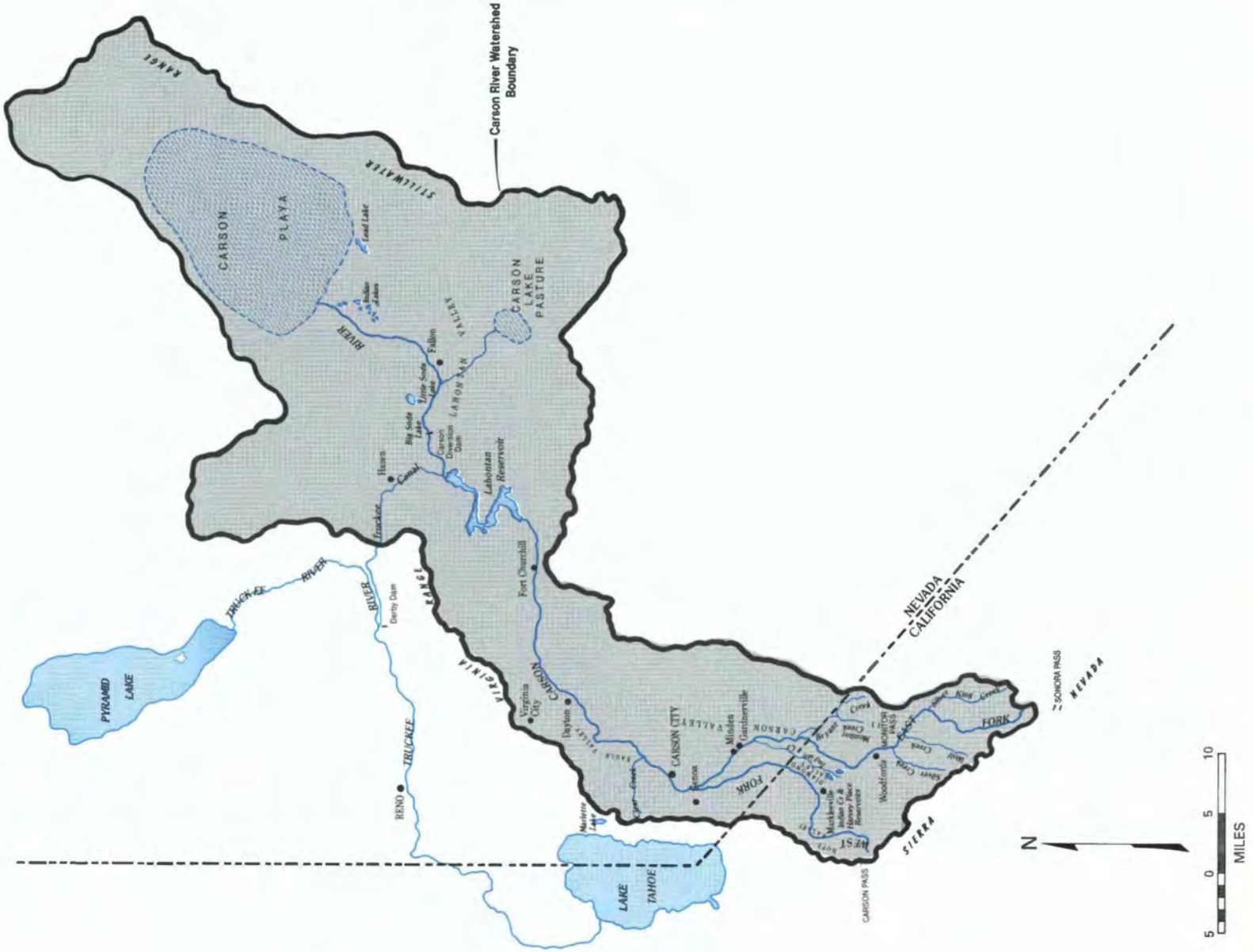


Figure 2
THE CARSON RIVER WATERSHED



Chapter 1

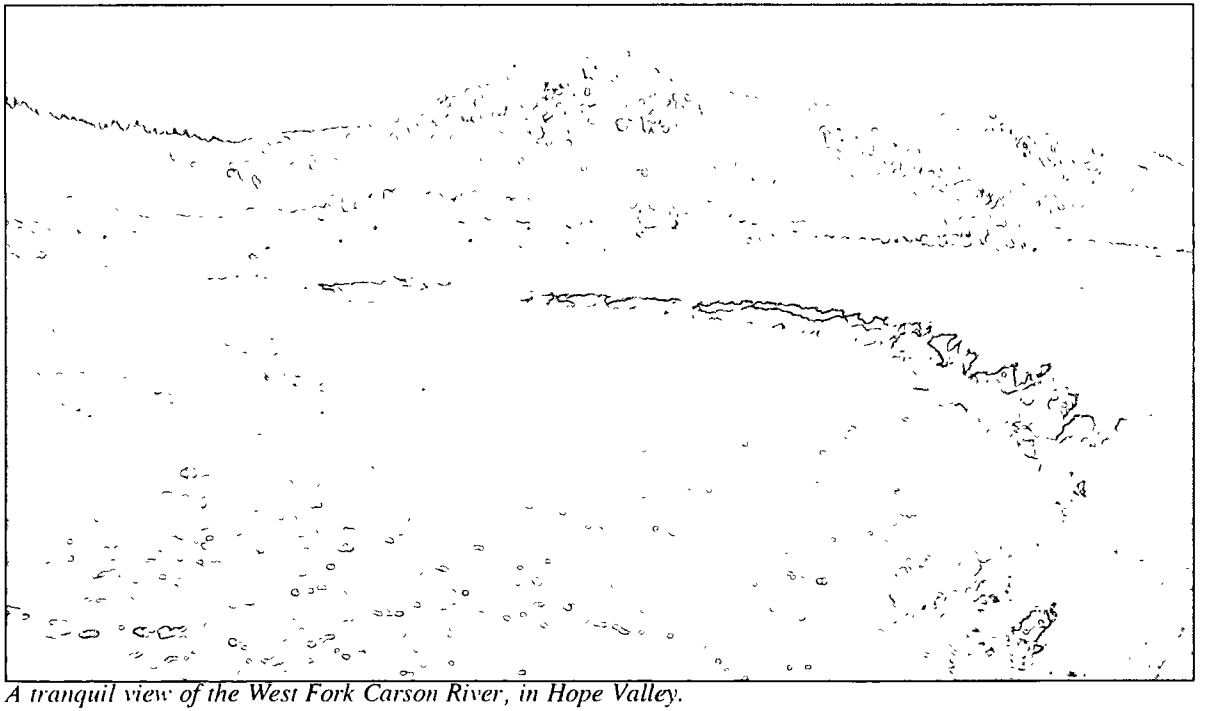
THE RIVER AND ITS ENVIRONMENT

This chapter traces the path of the Carson River from its headwaters in California's Sierra Nevada to its terminus in the Carson Sink in Nevada. Chapter 2 describes in greater detail the more significant lakes and reservoirs mentioned here.

In the upper watershed, the Carson River is divided into two parts — the East and West forks — both of which arise in the Sierras. The entire upper watershed in California is in Alpine County. A characteristic shared by both forks of the river at the higher elevations in the watershed is their steep gradients, or slopes of their channels, as shown in Figure 3. Another shared characteristic is the number of small lakes at the higher elevations. Some of the lakes have been converted to reservoirs by construction of small dams at their outlets. There are no large reservoirs in the upper watershed.

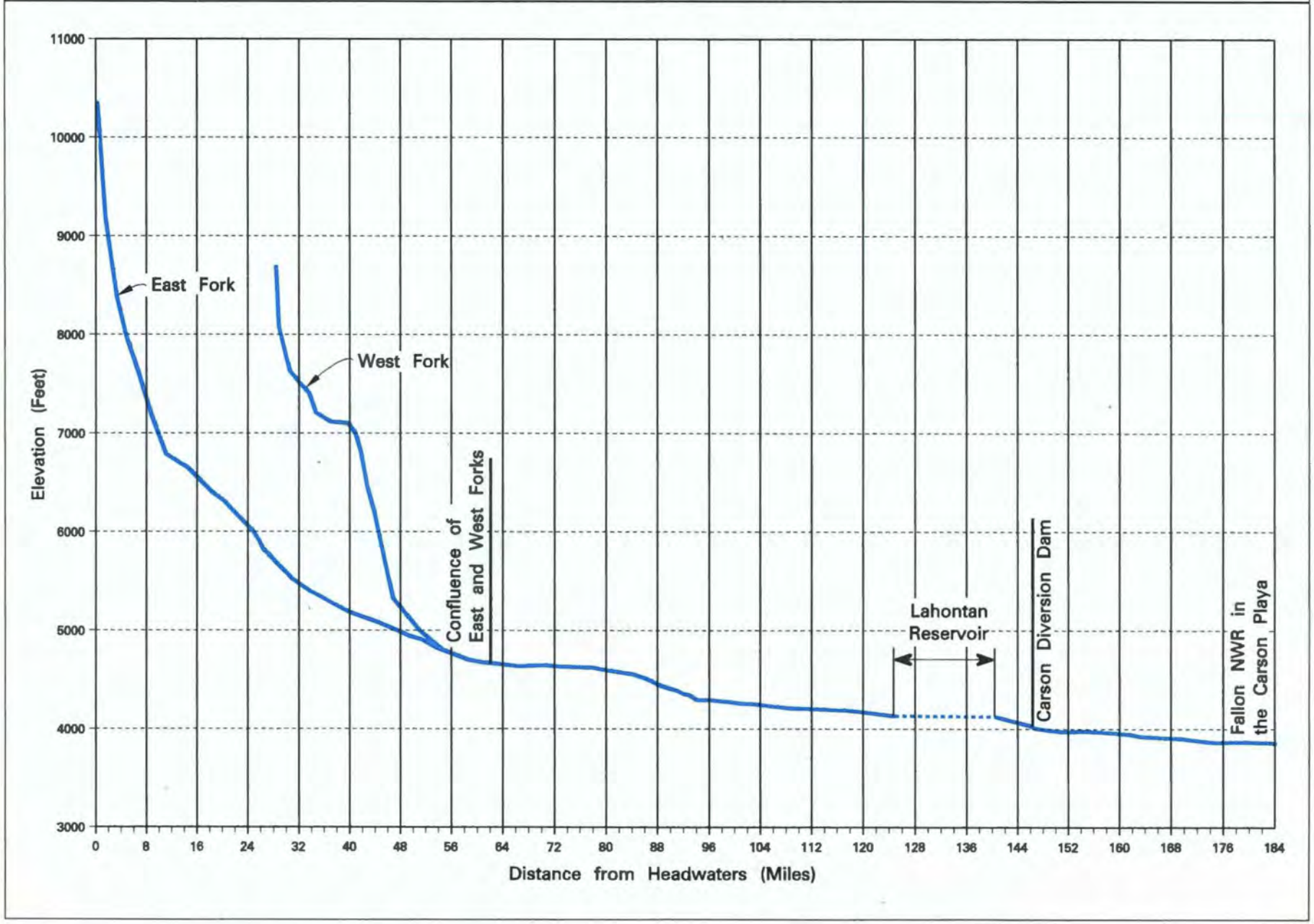
The West Fork, the smaller of the two forks of the river, begins as several minor tributaries that come together near Highway 88; scenic Red Lake, adjacent to the highway just below Carson Pass, feeds one of these tributaries. The West Fork parallels Highway 88 through Hope Valley and flows by the small town of Woodfords before entering Diamond Valley, near the stateline. Hope Valley, dominated by the encircling, predominantly granitic peaks, is a popular destination for back-country hikers and cross-country skiers, and affords access to surrounding U.S. Forest Service lands. (Hope Valley is one of three small valleys named by early settlers as Faith, Hope, and Charity valleys.)

Diamond Valley, crisscrossed by a multitude of irrigation canals, is the only agricultural area of any size in the upper watershed. Two small special-purpose reservoirs, Indian Creek and Harvey Place Reservoirs, lie adjacent to Diamond Valley and are discussed in Chapter 3.



A tranquil view of the West Fork Carson River, in Hope Valley.

Figure 3
LONGITUDINAL PROFILE OF THE CARSON RIVER



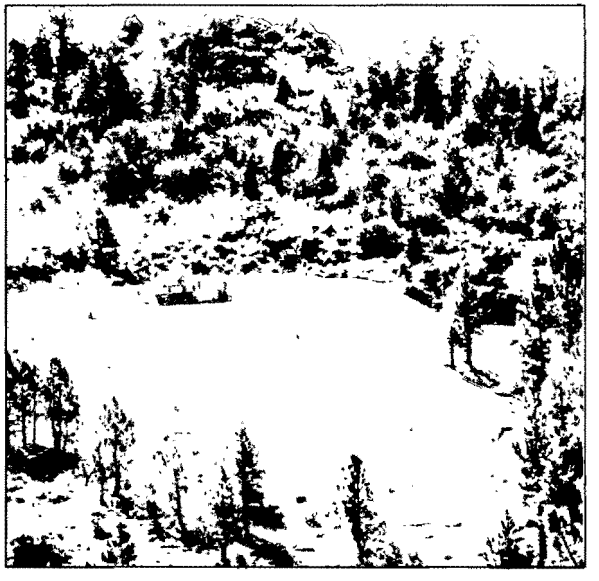
Snowshoe Thompson

Something about John "Snowshoe" Thompson struck a chord in peoples' imaginations, and many locations in the Sierras have Snowshoe Thompson stories associated with them. Thompson learned to ski in his native Norway. He later lived in Diamond Valley, and for twenty years (1856-1876) carried the mail between Placerville and Woodfords — on skis in the winter. The long wooden boards he used for skis, called snowshoes by the locals, bore little resemblance to today's cross-country skis. A historical marker in Alpine County honors the memory of Snowshoe Johnson, and two ditches in the Alpine Decree (discussed in Chapter 5) were named after him.

The East Fork originates farther south, beginning near Sonora Pass on Highway 108 and flowing through the Carson-Iceberg Wilderness Area before paralleling Highway 4 near its intersection with Highway 89. The river follows the highway northward for a distance, traversing a canyon in the volcanic rocks common throughout the area. The highest elevations of its drainage area contain several small alpine lakes that are used as reservoirs, including Upper and Lower Sunset lakes and Upper and Lower Kinney lakes. Important tributaries in this area include Silver King, Silver, and Wolf creeks. Monitor Creek (shown on some maps as Loope Creek, for the townsite of Loope) joins the East Fork farther downstream; this creek originates at Heenan Lake and drains part of a historic mining district known as the Monitor/Mogul District.

The East Fork veers eastward from the highway at the town of Markleeville and crosses into Nevada just above the confluence with Bryant Creek. Bryant Creek drains another significant area of mining activity, the Leviathan Mine, once a sulfur mine and now a focus of water quality concern.

Several small tributaries of the East Fork in this vicinity are fed by hot springs. Hot springs along the eastern face of the Sierras



Little remains of the mining boom in the Monitor/ Mogul District except for some tailing piles.

are evidence of the faulting that created the mountain range. The Sierras are a fault-block mountain range; fault scarps from past earthquakes are particularly obvious along the eastern flanks of the mountains. These fault zones, zones of intensely sheared and crushed rock, provide a pathway for movement of heated water to the surface. The relative abundance of hot springs is one of the East Fork's most well known characteristics.

Grover Hot Springs State Park, just outside Markleeville, includes pools, a campground, and a picnic area. The springs at the park feed Hot Springs Creek, a tributary of the East Fork. Another locally popular hot springs, accessible by an unpaved road, is on Forest Service land adjacent to the river and just upstream from the stateline. Downstream, in Nevada, Walleys Hot Springs has historically been a resort area.

The East and West forks leave the mountainous terrain of the Sierras as they join downstream of the stateline, near Genoa. Here the

The Early Mining Boom in Alpine County

Alpine County was created as the result of a small mining boom in the late 1850s and early 1860s, when gold and silver were discovered in the surrounding mountains. The county seat was originally established at the mining camp of Silver Mountain City — today only a few traces of foundations remain of this site. The county seat was moved to Markleeville in 1875; with the resourcefulness common to the early miners, several of the stone buildings in Silver Mountain City were moved to Markleeville. The Alpine Hotel which today stands on Markleeville's main street was one such relocated building; the stone county courthouse was constructed from rhyolite ashlars salvaged from buildings at Silver Mountain City. Mining activity was most intensely focused in the areas around the townsites of Silver King, Silver Mountain City, and Monitor. The town of Monitor was located adjacent to today's highway over Monitor Pass, near Colorado Hill, a vividly colored local landmark composed of highly altered and silicified volcanic rocks. The Monitor/Mogul Mining District, the county's greatest producer of gold and silver, along with lead, zinc, copper, and mercury, is today the site of scattered tailing piles and a few remnants of foundations. Only the Zaca Mine on Colorado Hill remains active. The county's population at the height of the mining boom peaked at about 11,600 in 1864, but the population declined to a few hundred people when the demand for silver fell off. The population has never again achieved the peak experienced during the mining years; in the last decade (1980-1990), the county's population has remained stable at slightly over 1000.

river enters the broad Carson Valley, which is typical of the basin and range geomorphic province in Nevada. Basin and range topography is characterized by alternating valleys and fault block mountain ranges. Faulting uplifted the mountain ranges, leaving valleys, or basins, bounded on either side by the fault zones.

The Carson Valley is largely agricultural, although suburban development is increasing in the Minden/Gardnerville area. The canal and ditch systems that begin in the Diamond Valley area in California also serve agricultural water users in the Carson Valley.

The river skirts an edge of Eagle Valley, where Carson City is located, before turning sharply eastward. The silver dome on the state capitol in Carson City reflects Nevada's heritage as the "Silver State" and the importance of the Comstock Lode in the state's early history. The first significant use of water from the Carson River was because of this silver boom.

The river then traverses a narrow canyon between the Virginia Range to the north and the Pine Nut Mountains to the south and enters a small valley at the head of which lies the town of Dayton, adjoined by Dayton State Park. Dayton, one of Nevada's oldest communities, was established as a trading post in 1849. With the discovery of silver in the Comstock, Dayton grew as a mill town, where the silver ores from the nearby mines of the Virginia City area were crushed and processed.

The Dayton area's famous landmark is the adit of the nearby Sutro Tunnel. This tunnel was constructed during the height of the mining boom, when rising water levels in the mine workings were flooding stopes and threatening further development of the ore zone. The tunnel was designed to drain the workings, and in so doing was a contributor to the continued success of the silver mines (and a financial success for Adolf Sutro, the backer of the project, who charged the mine owners fees for use of the drainage tunnel). The tunnel still exists but is not in use and is closed to public access.

The Alpine County Courthouse in Markleeville was constructed of stones recycled from buildings in Silver Mountain City.

The mining of the Comstock has left another, less desirable, legacy in the form of trace metal contaminants in soil and water. A reach of the river near Dayton has been nominated for addition to the U.S. Environmental Protection Agency's list of Superfund hazardous waste sites, and an area of the park at Dayton was recently fenced off because of high mercury concentrations in tailing piles. Mercury is common in the area because it was used extensively in milling ore.

After the river leaves the Dayton area, it passes through another short canyon reach before bending southward around Churchill Butte and flowing by the site of Fort Churchill State Park. The fort, whose ruins are preserved today, was occupied briefly by the U.S. Army when Indian attacks were feared in the 1860s.

Mark Twain in the Nevada Territory

Mark Twain described his travels throughout the west in his book, Roughing It. He visited the silver mining areas of the Comstock Lode, stayed in Carson City, and worked for a time at the Territorial Enterprise, the Virginia City newspaper. He had this to say about his sojourn in the Nevada Territory (Nevada was not yet a state):

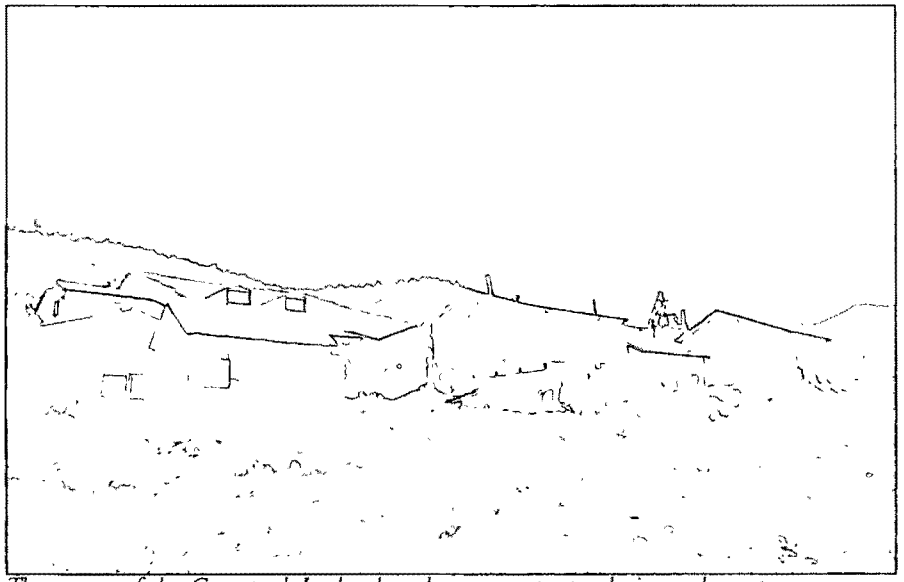
"Visibly our new home was a desert, walled in by barren, snow-clad mountains. There was not a tree in sight. There was no vegetation but the endless sage-brush and greasewood. All nature was gray with it. We were plowing through great deeps of powdery alkali dust that rose in thick clouds and floated across the plain like smoke from a burning house."

"After leaving the Sink [the Carson Sink], we traveled along the Humboldt River a little way. People accustomed to the monster mile-wide Mississippi, grow accustomed to associating the term 'river' with a high degree of watery grandeur. Consequently, such people feel rather disappointed when they stand on the shores of the Humboldt or the Carson and find that a 'river' in Nevada is a sickly rivulet which is just the counterpart of the Erie canal in all respects save that the canal is twice as long and four times as deep."

The Sutro Tunnel

Construction of the Sutro Tunnel was counted as one of the great engineering feats associated with the Comstock, together with invention of square set stoping for mine support and design of a water supply pipeline to withstand very high pressures (described in Chapter 2). The following description of the tunnel is taken from Dan DeQuille's account published in 1889.

> *"Levels were flooded so suddenly that oftentimes the miners narrowly escaped being drowned by the vast subterranean reservoirs that were unexpectedly tapped. Great delays in mining were caused by these floods, and to pump out the water that filled the lower levels cost immense amounts of money.... In order to overcome these water troubles, Adolf Sutro early conceived the idea of running an immense drain tunnel under the Comstock Lode from the lowest possible point.... work was commenced on the great drain tunnel (since known as the Sutro Tunnel) October 19, 1869. It starts at the edge of the valley of the Carson River, at a point nearly east of Virginia City, and has a length of 20,145 feet — nearly 4 miles. It taps the central parts of the Comstock Lode at a depth of about 1,650 feet. The tunnel is 16 feet wide and 12 feet high.... It required nearly eight years to construct the tunnel, and the total cost was about $4,500,000.... The flow of water through the tunnel has at times been over 10,000,000 gallons in twenty-four hours.... Though it never paid anything near what was anticipated by Mr. Sutro, the tunnel still brings in a snug sum annually. Last year (the fiscal year that ended February 29, 1888) the receipts for royalties amounted to $237,258.33."*



The mines of the Comstock Lode played an important role in early water development in the Carson basin.

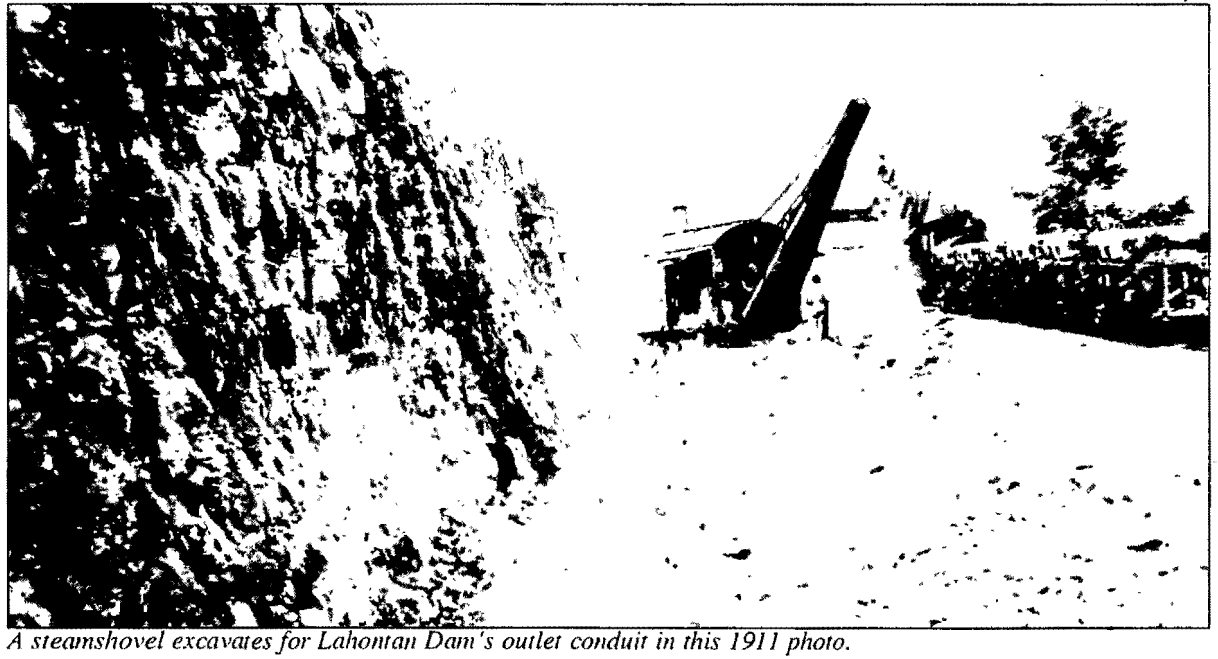
Fort Churchill, which saw only brief service as an army outpost, is the site of an important streamflow gage on the Carson River.

The river then enters Lahontan Reservoir. Lahontan, the only large reservoir on the entire Carson River, was completed by the Bureau of Reclamation in 1915 as a facility of its Newlands Reclamation Project. The reservoir, with a capacity of 314,000 acre-feet, is long and narrow, following the contours of the former river channel. Lahontan Dam, adjacent to U.S. Highway 50, is a 162-foot-high earthfill dam with a hydropower plant immediately downstream. Lahontan Dam impounds the entire flow of the Carson River, plus water diverted from the Truckee River via the Truckee Canal.

The Newlands Project, the Nation's first project under the Reclamation Act of 1902, is divided into two portions — the Truckee Division, near Fernley in the Truckee River watershed to the north, and the larger Carson Division, near Fallon in the Lahontan Valley within the Carson River watershed. Since the flow of the Carson River alone was not sufficient to irrigate the entire acreage estimated to be arable, the Truckee Canal was designed to divert a substantial amount of Truckee River water south to augment the Carson's flow at Lahontan Dam. Water is released from the dam into a network of canals and laterals operated by Truckee-Carson Irrigation District, which contracts with the Bureau of Reclamation for the Newlands Project water supply. The facilities also

Lahontan Dam — centerpiece of the Bureau of Reclamation's Newlands Project.

U.S. Bureau of Reclamation, Carson City



A steamshovel excavates for Lahontan Dam's outlet conduit in this 1911 photo.

Wasteland or Desert?

"Here is no water but only rock
Rock and no water and the sandy road
The road winding above among the mountains
Which are mountains of rock without water"

This quotation from T.S. Eliot's poem The Wasteland is an accurate description of the aridity of parts of the Carson Desert, and illustrates a common perception of deserts. Pioneers traveling the immigrant trails and early settlers of the west often thought of the desert as an obstacle to be conquered, rather than appreciating it for its unique, if stark, beauty. The historic wagon route through the Carson Desert traversed an area known, and feared, as the Forty-Mile Desert. Even as recently as 1964, when the U.S. Geological Survey published a report on the geology of the Carson Desert, the desert's harsh features were highlighted:

"The arid desolation of the Carson Desert area outside the irrigated farming district appeals to few people, and indeed repels most. Few parts of the United States have so starkly forbidding an aspect of parched lowlands and somber mountains, with only the scantiest of verdure."

These typical attitudes toward desert lands help us understand the wide popular support that early reclamation projects received.

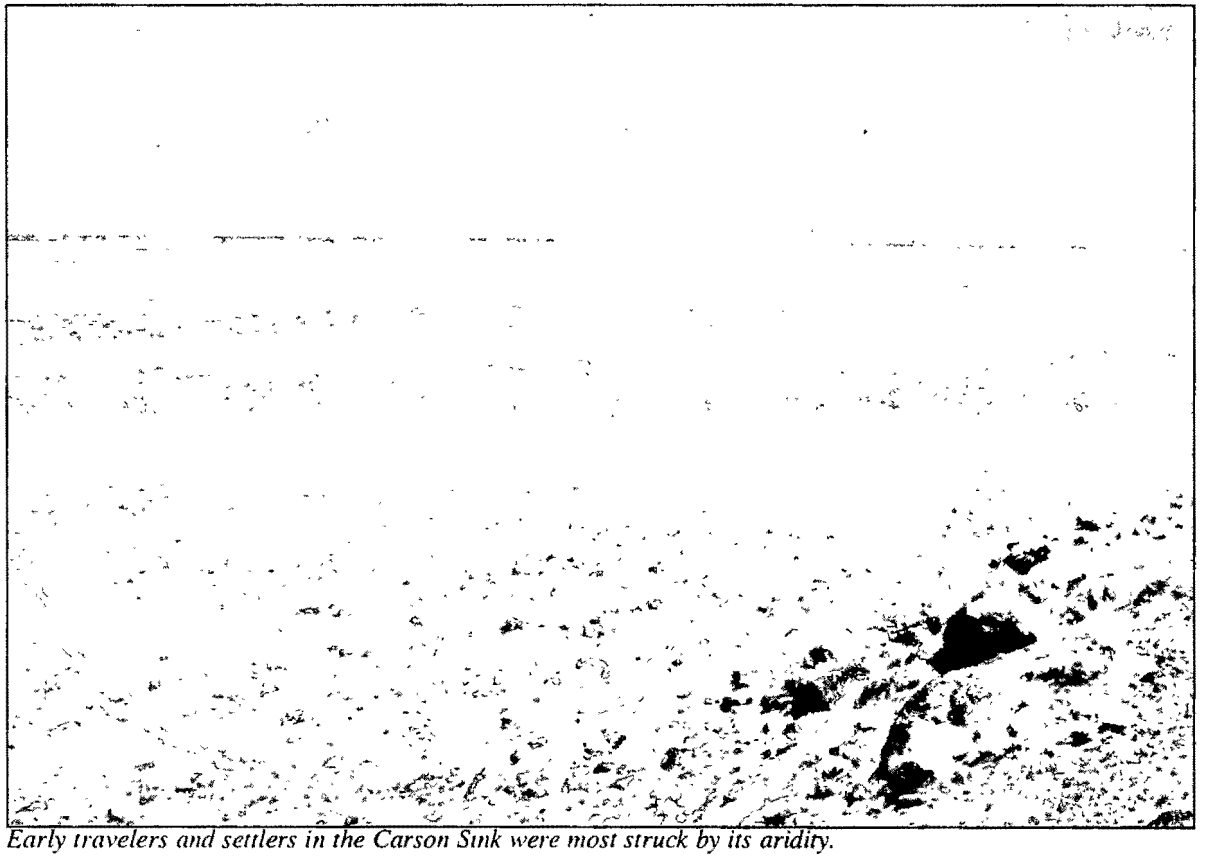
include an agricultural drainage system and several small downstream regulatory reservoirs, designed to aid in distributing water throughout the project.

Before construction of the Newlands Project, the Carson River terminated in an area some maps call the Carson Desert. Historically this arid basin, the watershed's point of lowest elevation, was a desert, but construction of irrigation works in the Fallon area has caused agricultural and related municipal development on much former desert land. In earlier geologic time, this low-lying desert area was submerged under prehistoric Lake Lahontan.

It is often said today that the river terminates in the Carson Sink — but the term "Carson Sink" has had more than one meaning. The name has historically been applied to both the entire area of the closed drainage basin in the general area of Fallon (*i.e.*, the Carson Desert) and to just the extreme northeastern portion of this basin. The confusion over nomenclature is further complicated by the fact that the river's course below Lahontan Dam has been altered by development in the region and is to some extent dependent on the amount of flow.

There are today several individual sinks within the larger closed drainage basin. One channel of the river turns northward near Fallon, leading to the playa lake[1] called by some the Carson Sink. Water now reaches this extreme northeastern portion of the basin only in the wettest years. Another channel turns southward toward a sink area locally known as Carson Lake or Carson Lake Pasture.[2] These features are shown on Figure 5 in Chapter 2.

A sink is a common feature of closed drainage basins; water leaves a sink only by evaporation. Under natural circumstances, a sink can range from a shallow lake or marshland area to a dry alkali flat, depending on hydrologic conditions. In wetter years a sink will fill with floodwaters and a shallow lake or series of lakes will be created, the level of which will fluctuate as the water evaporates[3]. In dryer years a sink may contain little open water, but high ground water levels may still support wetlands vegetation.



Early travelers and settlers in the Carson Sink were most struck by its aridity.

1 Geologists use the term "playa" to refer to a dry desert lakebed that may receive occasional floodflows.

2 To further confuse this subject, some of the earliest writings about this area called today's playa lake in the northeastern corner of the basin "Carson Lake".

3 Evaporation is high in this arid desert region, reported by various sources to range from 4 to 6 feet per year at different locations.

Prehistoric Residents of Stillwater Marsh

Archaeologists have been viewing with great interest the area known today as Stillwater Marsh since floodwaters in the early 1980s exposed Indian burial sites. It is now believed that the marsh may be one of Nevada's most significant archaeological sites, having more human remains than other areas discovered to date. Some sites have been dated at over 3,000 years old; the most recent sites are perhaps 800 years old. Found in the area were remains of huts, middens, assorted artifacts, and numerous animal bones. Many of the animal bones represented typical marsh-dwelling species, including the tui chub fish, ducks, geese, pelicans, swans, minks, otters, weasels, and muskrats. Mink and otter are no longer present, due to the lack of sufficient fresh water to support them.

Historically waters of the Carson River spread out over a broad region to the east of present-day Fallon, creating a series of lakes and marsh areas of varying size, some ephemeral and some not. The Stillwater area, discussed below, is one remnant of these earlier wetlands. In an 1898 visit, one Federal Government employee, whose words are preserved in the Smithsonian Institute's archives, described the Carson Sink (in the Stillwater area) as:

> *"half shallow lake, half tule swamp which extends for 20 miles along the valley bottom and furnishes enough salt grass, sedges, and tules to winter many thousand head of stock, and a breeding ground for great numbers of water and shore birds."*

The term "Carson Sink" is used in this report in its broadest possible sense to refer to the closed drainage basin below Lahontan Reservoir, which contains a number of individual sinks. The alkali flats in the extreme northeastern portion of the basin are designated the "Carson Playa". The former lake area at the southern end of the basin is called by its local name of "Carson Lake Pasture"[1]. There are several other lakes or collections of ponds in this basin — Indian Lakes, the lakes in Stillwater area, and Soda Lakes. These lakes are mentioned individually in subsequent chapters.

Settlement and agricultural development in the area have altered the flow patterns and amount of water reaching the remaining wetlands in the sink. In wet years when floodwaters exceed the needs of agricultural users, the excess flows primarily reach the Carson Lake Pasture south of Fallon and the Stillwater area northeast of Fallon; floodwaters seldom reach the alkali flats of the Carson Playa.

Several wildlife refuges have been established for waterfowl and migratory shorebirds in this area; obtaining enough water to support these refuges has been one of the major resource management issues on the Carson River.

1 The area has been managed in the past for both livestock grazing and wildlife habitat.

Lahontan Valley Wetlands

"But now they drift on the still water,
Mysterious, beautiful;
Among what rushes will they build,
By what lake's edge or pool
Delight men's eyes when I awake some day
To find they have flown away?"

This quotation from W.B. Yeats' 1919 poem, The Wild Swans at Coole, presages later fears by conservationists that avian visitors to the Lahontan Valley wetlands would fly away and not return as wetlands acreages rapidly declined. Improving wetlands water supply was an important goal in the 1990 federal water rights settlement legislation discussed in Chapter 5.

Efforts to preserve wetlands in the valley began as early as 1931, when the federal government established the Fallon National Wildlife Refuge, which covered about 17,900 acres of federally owned land. Stillwater Wildlife Management Area, 24,000 acres of which was designated as Stillwater National Wildlife Refuge, was created in 1948. This wildlife management area covered about 200,000 acres, all but about 40,000 of which were owned by the federal government. Carson Lake Pasture has been managed since 1980 by the Nevada Department of Wildlife under an agreement with Truckee-Carson Irrigation District; the area occupies land controlled by the U.S. Bureau of Reclamation and operated by TCID. With the recent passage of the settlement act discussed in Chapter 5, the Stillwater Wildlife Refuge is to be expanded to about 77,520 acres by incorporation of additional federally owned lands. Provisions of the act also call for transfer of the federally owned Carson Lake Pasture area to the State of Nevada, to be managed as a state wildlife refuge.

The Lahontan Valley wetlands were collectively designated as a western hemisphere shorebird reserve in 1988, one of a handful of such reserves in the United States. Ducks, geese, and swans use the area extensively during annual migration periods — more than half of the Pacific Flyway fall canvasback duck population passes through the area. The wetlands also support over 50 percent of the North American long-billed dowitchers population and host the largest single breeding colony of white-faced ibis in North America. Bald eagles overwinter in the wetlands and American white pelicans fly in to feed from their nesting colony at Pyramid Lake.

John Kramer

Canada geese, photographed here in a Reno park, are frequent winter visitors to the wetlands.

Pyramid Lake Fisheries

These American white pelicans nest on an island in Pyramid Lake and commute about 60 miles to the Lahontan Valley wetlands to feed in the shallow waters there.

Chapter 2

LAKES AND RESERVOIRS

This chapter describes the more significant lakes and reservoirs in the Carson River watershed. The descriptions illustrate the wide range of geomorphic conditions in the watershed — from the tarns and alpine reservoirs of the Sierras to dry desert playas. Lahontan Reservoir, in Nevada, is the only large reservoir on the river. The small upstream lakes and reservoirs characteristic of the upper watershed, taken together, constitute only a minor fraction of Lahontan's storage capacity and do not play a significant role in river operation. Lahontan is sometimes thought of as the present-day terminus of the Carson River, and the reservoir is the only point at which the entire river's flow can be controlled.

The High Alpine Reservoirs

The phrase "high alpine reservoirs" is a term of art taken from a federal court water rights decision known as the Alpine Decree, which is covered in Chapter 5. Among other things, the decree defined the rights of water users to store water in the many small lakes and reservoirs, some shaped by relatively recent glacial activity, found in the upper watershed. Table 1 is a listing of these reservoirs taken from the decree; the priority date shown for each facility reflects the first time when a claim was made to use the water. Figure 4 shows the location of these reservoirs.[1]

As can be seen by the storage capacities shown in the table, these are indeed very small reservoirs. The reservoirs were originally constructed to serve water for agricultural purposes such as raising alfalfa and irrigating pasture for livestock. Some of the reservoirs are small natural lakes whose storage capacity was enhanced by dam construction. With a few exceptions, the reservoirs still serve primarily agricultural uses, although several also support complementary recreational uses. In the future, uses of some reservoirs may change to recreation or to support of fish habitat.

Water rights in several of the small reservoirs have recently been offered for sale, and the California Department of Fish and Game and private environmental organizations have expressed interest purchasing them. The Department of Fish and Game has purchased land around Heenan Lake and has made arrangements to use some of the stored water there to raise wild (*i.e.*, non-hatchery) Lahontan cutthroat trout.

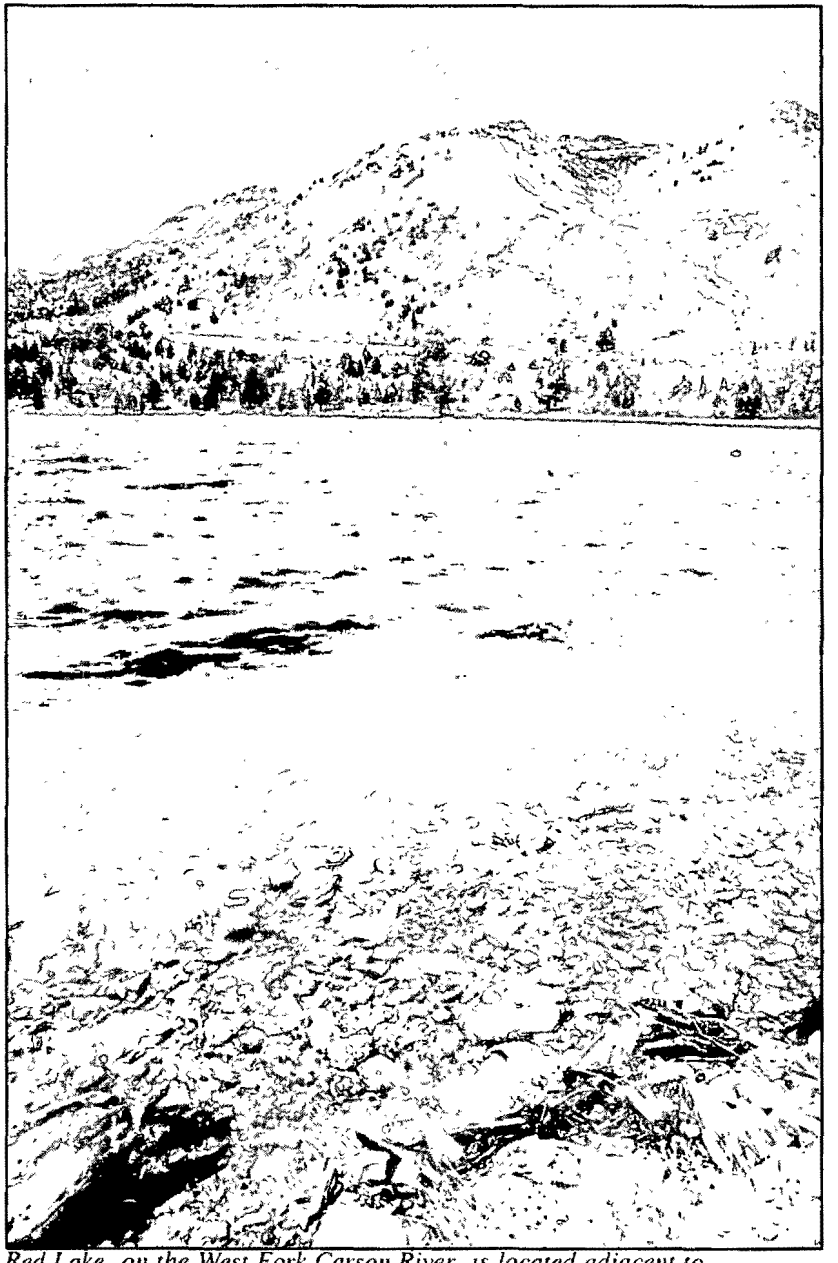
Construction of most of the high alpine reservoirs began around the turn of the century. Many of the reservoir sites were acquired and developed under the auspices of the Alpine Company (later known as the Alpine Land and Reservoir Company). The Company was formed by a group of farmers in the Carson Valley in Nevada, who sought to conserve the spring runoff of the Carson River so that the water could be used for irrigation later in the summer when the river's natural flow dwindled to a trickle. Individual farmers, often themselves stockholders in the Alpine Land and Reservoir Company, also constructed additional reservoirs such as Heenan Lake and Mud Lake.

1 Some reservoir names on Figure 4 differ slightly from those contained in the Alpine Decree and in Table 1. The figure reflects present U.S. Geological Survey topographical map nomenclature. In some cases the table contains older place names in use at the time the decree was being litigated.

Table 1
THE HIGH ALPINE RESERVOIRS

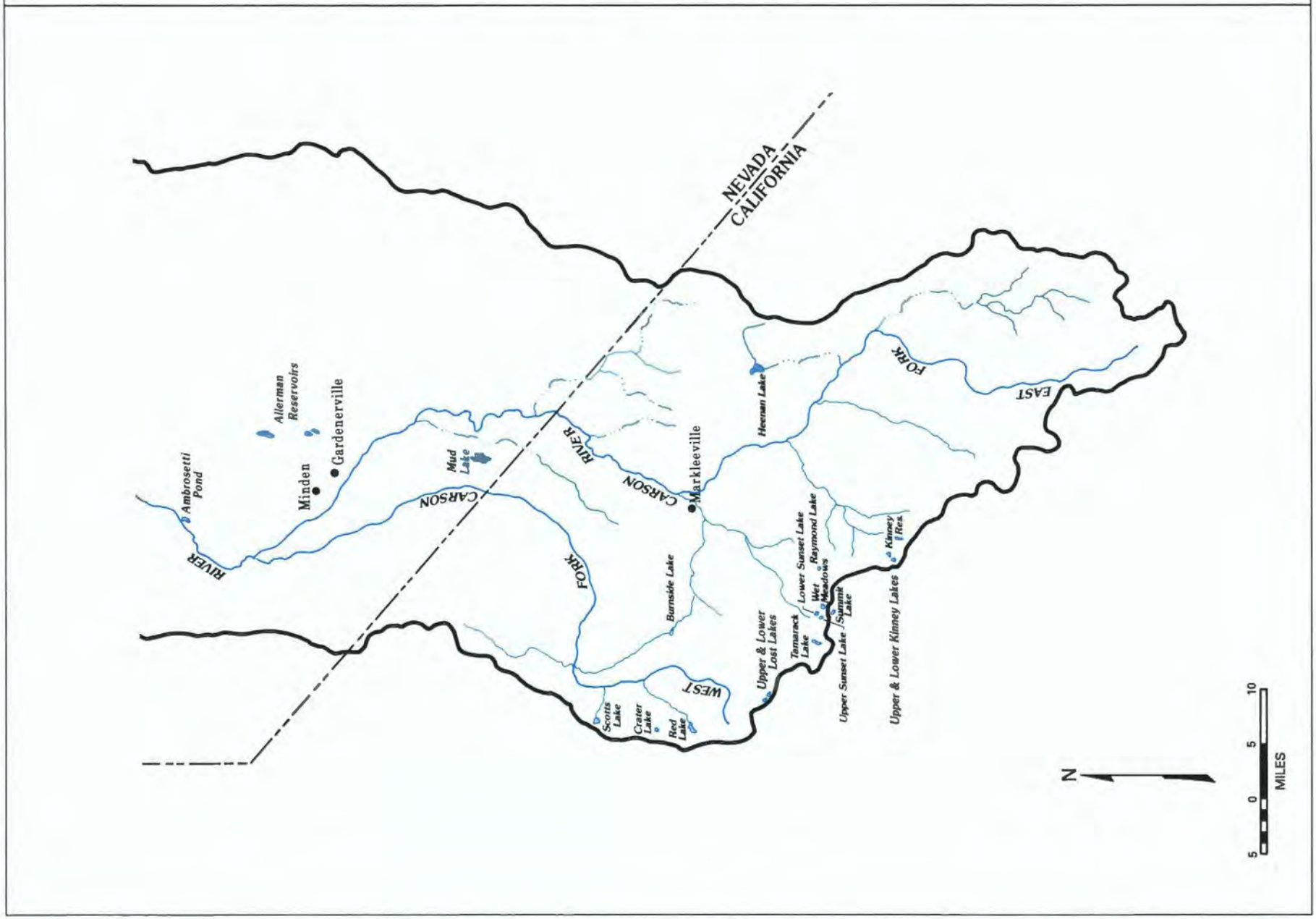
Reservoir	Water Right Priority (Year)	Capacity* (Acre-Feet)	Water Source
		In California	
Tamarac Lake	1895	404	East Fork, Pleasant Valley Creek
Kinney Meadows	1895	435	East Fork, Silver Creek
Upper Kinney Lake	1895	320	East Fork, Silver Creek
Lower Kinney Lake	1895	495	East Fork, Silver Creek
Wet Meadows	1895	207	East Fork, Pleasant Valley Creek
Lower Sunset	1895	250	East Fork, Pleasant Valley Creek
Upper Sunset	1895	68	East Fork, Pleasant Valley Creek
Summit Lake	1901	31	East Fork, Pleasant Valley Creek
Raymond Lake	1895	50	East Fork, Pleasant Creek
Heenan Lake	1923	2948	East Fork, Heenan Lake Creek
Burnside Lake	1892	100	East Fork
Scott Lake	1895	100	West Fork, Scott Creek
	1918	408	West Fork, Scott Creek
Red Lake	1895	300	West Fork, Red Lake Creek
	1922	803	West Fork, Red Lake Creek
Crater Lake	1895	167	West Fork, Crater Lake Creek
Upper or East Lost Lake	1924	92	West Fork
Lower or West Lost Lake	1924	127	West Fork
		In Nevada	
Mud Lake	1879	789	East Fork, Indian Creek and West Fork
	1909	2383	East Fork, Indian Creek and West Fork
Allerman No. 1, 2, and 4	1877	250	East Fork, on Allerman Canal
	1905	831	East Fork, on Allerman Canal
Ambrosetti	1882	200	East Fork, below Williams Slough Ditch

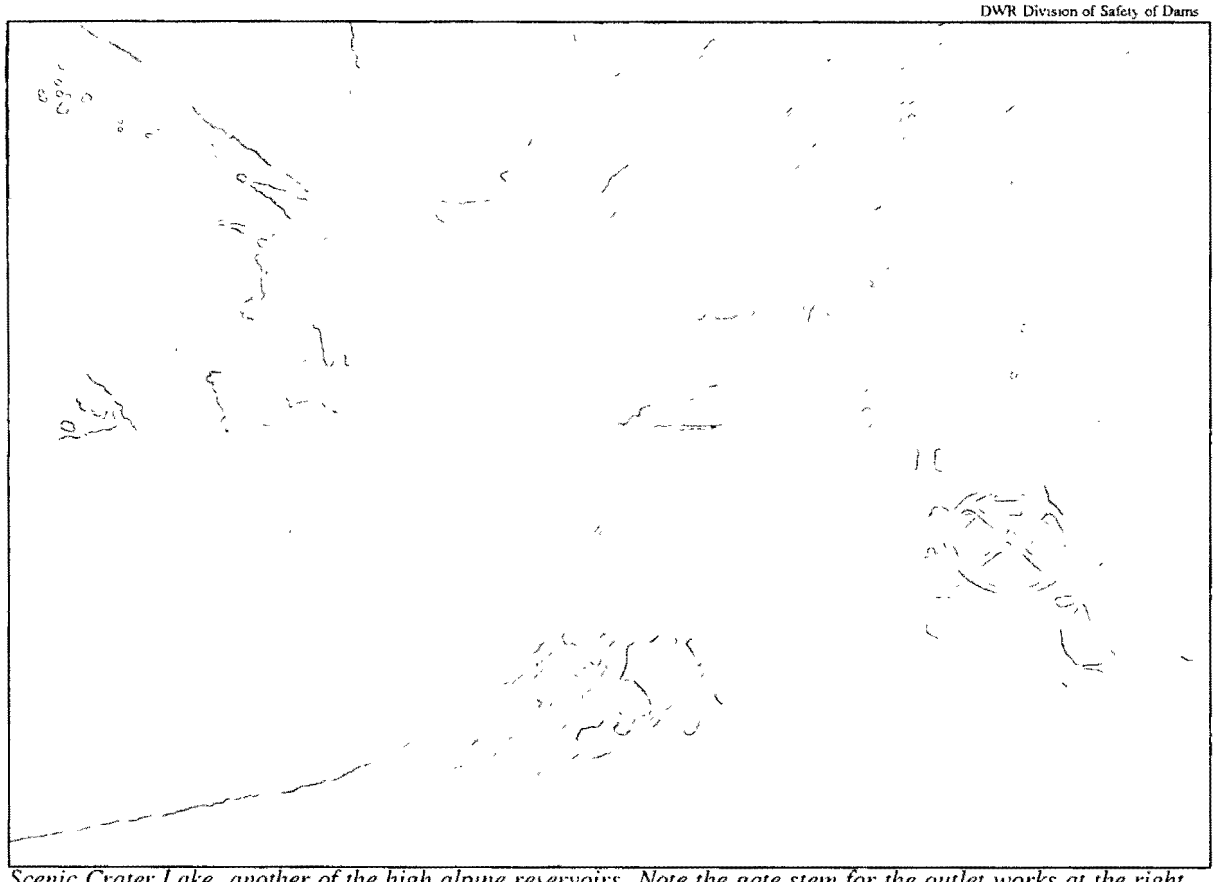
* These figures are the capacities as shown in the Alpine Decree: actual capacities today may differ due to subsequent alterations to the facilities.



Red Lake, on the West Fork Carson River, is located adjacent to Highway 88, at the watershed's upper edge.

Figure 4
LOCATIONS OF THE HIGH ALPINE RESERVOIRS





Scenic Crater Lake, another of the high alpine reservoirs. Note the gate stem for the outlet works at the right edge of the photo.

The earliest dams were often small earth and timber crib structures literally scraped together with whatever human and equine labor the farmers could spare from their agricultural work. Before construction of modern roads, access to these high elevation sites was both seasonally limited and physically difficult. At some sites, construction material was hauled as far as possible with wagons, then transferred to stone boats for the final miles. Most of the older dams have been reconstructed at least once, and several have been enlarged. Today's dams have been improved substantially, and those located in California and exceeding a certain size must meet safety requirements established by the Department of Water Resources' dam safety program.

The excerpts below from the Alpine Land and Reservoir Company's reports to its stockholders were submitted as testimony in the Alpine Decree case; the reports provide a flavor of construction techniques of the times.

"The dam put in at the lower end on Kinney Meadows measures in width at the bottom 88 feet in width at the top 20 feet, in length at the bottom 62 feet, in length at the top 160 feet and is 24 feet high. The dam put in at the Lower Kinney measures in width at the bottom 74 feet, in width at the top 35 feet in length at the bottom 30 feet, in length at the top 175 feet and is 16 feet high. It wants a couple of days scraping next spring with four horses, the four horse scraper being left there. We started work on the Kinney Meadow Dam on the 5th day of Aug. 1908 with 8 men & 8 horses & we started work on the Lower Kinney Lake Dam on the 7th day of Sept. 1908 with 6 men & 9 horses and we quit work up there on October 14 1908."

(From the 1908 report.)

"Made dam on upper Tamarack a little stronger & higher by scraping dirt on the top & raising inside rock wall 2 feet. Also blasted the spillway on the lower dam, & blasted & scraped out ditch at Indian Valley. Also done repair work on gates on Upper Sunset. Also repaired gate on Kinney Meadows reservoir. All gates were closed on the 13 day of Sept. I tried to do work on dam at Raymond Lake but could not do anything as the old dam is all caved in & about 5 feet of water in lake. This reservoir needs a new pipe, also the dam at Summit Lake needs a new pipe."

(From the 1918 report.)

The high alpine reservoirs were originally constructed to supplement the Carson River's meager natural flow so the irrigation season could be extended longer into the summer. Rights to this stored water were a subject of debate in the Alpine Decree litigation, leading to this interesting provision in the court's decree:

"The high alpine reservoirs on both forks of the river are filled out of the priority order. This is done because the snow does not melt sufficiently at those high elevations to fill the reservoirs until the summer when the river flow has already begun to diminish down in the valley."

DWR Division of Safety of Dams

Heenan Lake at a relatively low water level. Note the outlet works in the background. This reservoir was originally constructed to serve agricultural use. Today it is also used to support a program of raising wild Lahontan cutthroat trout.

The decree also specifically recognizes historical practices of water management, thus allowing the high alpine reservoirs to fill more than once in the runoff season, as irrigation releases create space for storage of additional inflows.

Water for the Mines

The first major development of Carson River water was for mining, followed later by agricultural development as a ranching community was established to provide the supplies needed by the miners. The small alpine reservoirs described previously belonged to this later phase of development — the water they provided was both too little and too distant to power the ore and lumber mills associated with the Comstock Lode. The mainstem Carson River was used for this task, but the problem of water supply for the mining towns remained. The mining towns of the Virginia Range were chronically short of water — the meager springs available, coupled with ground water from some of the mining tunnels, were not sufficient to supply domestic uses. In his comments about the water supply available to the residents, early Nevada chronicler Dan DeQuille had this to say:

> *"... but in the summer, when water was most needed, the tunnels furnished but feeble streams and these were much impregnated with minerals, one of the least feared of which was arsenic. The ladies rather liked arsenic, as it improved their complexion; made them fair and rosy-cheeked — almost young again, some of them. The miners did not object to arsenic, as, while it did not injure their complexion, it strengthened their lungs — made them strong-winded and able to scale mountains."*

Although this writer is correct in his observation that water draining from highly mineralized ore deposits often contains undesirable constituents, his statements about the health benefits of arsenic are obviously hyperbole. Arsenic is a toxin to humans and to other species, depending on the dose.

This same writer also described the efforts of the local water company to seek more water by tunneling into promising hillsides:

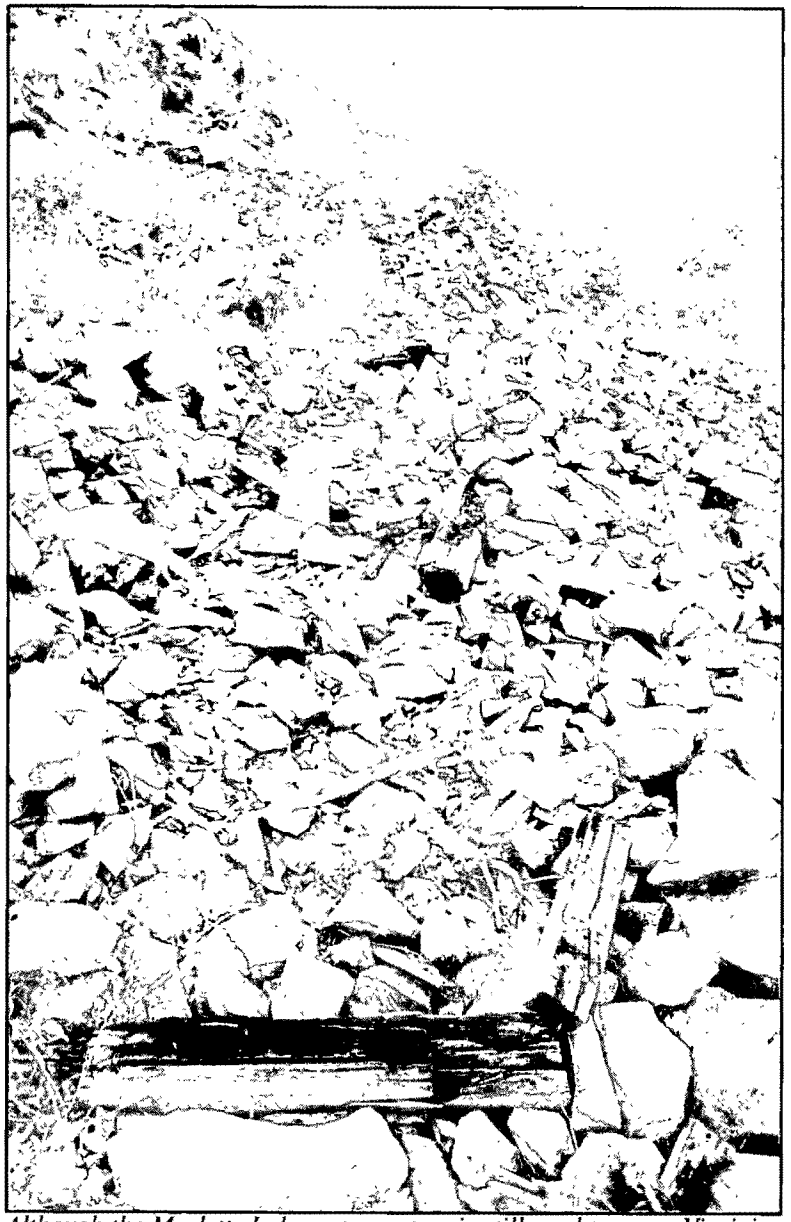
> *"These tunnels were run for no other purpose than to find water. A hill was examined with a view to its water-producing capacity. It was found that those that rose up in a single sharp or rounded peak were not rich in water. The best water-producers were hills on the tops of which there were large areas of flat ground."*

It was determined that the best possibility for improving the water supply was to import water from the Truckee River watershed surrounding Lake Tahoe — specifically from Marlette Lake. The difficulty in conveying water to the Comstock was not in the distance, but in the difference in elevation. The pipe would have to withstand a head of about 1,800 feet (meaning the pressure exerted by a column of water this high) as it left the Sierras, dropped down into and crossed Washoe Valley, and turned again uphill to the summit of the Virginia Range. The pipe would be an inverted siphon; at the time no such water pipeline had been constructed for these high pressures. One backer of the project, James Flood, gave an often-quoted reply when asked if the pipeline was possible:

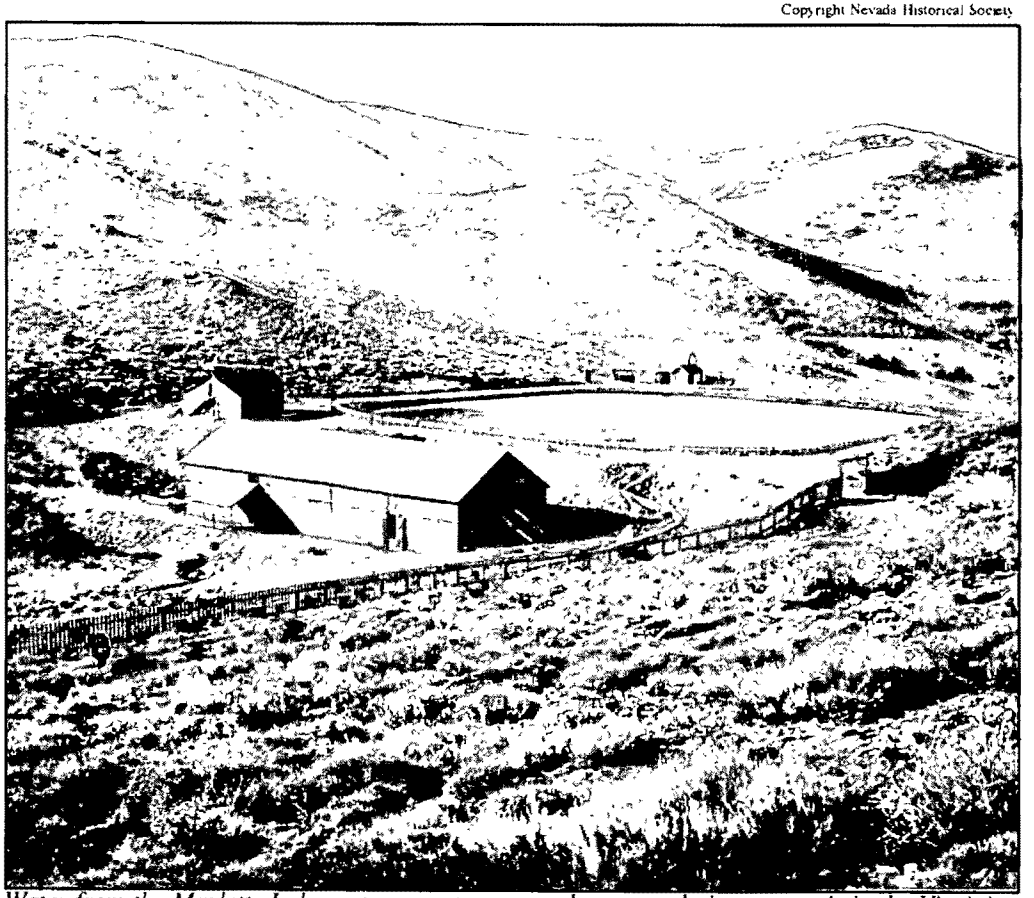
> *"Everything can be done nowadays; the only question is — will it pay?"*

The design and construction of the pipeline came to be viewed as one of the great engineering feats of the Comstock. A wrought-iron pipe 11.5 inches in diameter was selected for the critical high-pressure section. It was fabricated in San Francisco out of steel plates rolled into a cylinder and connected with rivets. Then came the day when the finished pipeline was to be tested (remember that this was before the days of the telephone). DeQuille says:

> *"As the pipe filled, the progress of water in it could be traced by the blowing off of the air [from specially designed air vents in the pipe] on the tops of the ridges through the valley, and at last, to the great joy of the engineer and all concerned in the success of the enterprise, the signal fire at the outlet, on the summit of the Virginia Range, was for the first time lighted, showing that the water was flowing through the whole length of the pipe. When the water reached Virginia there was great rejoicing. Cannon were fired, bands of music paraded the streets, and rockets were sent up all over the city. Many persons went out and filled bottles with this first water from the Sierras...."*



Although the Marlette Lake water system is still used to serve Virginia City, only traces remain of the original wooden flumes that were a part of the system.

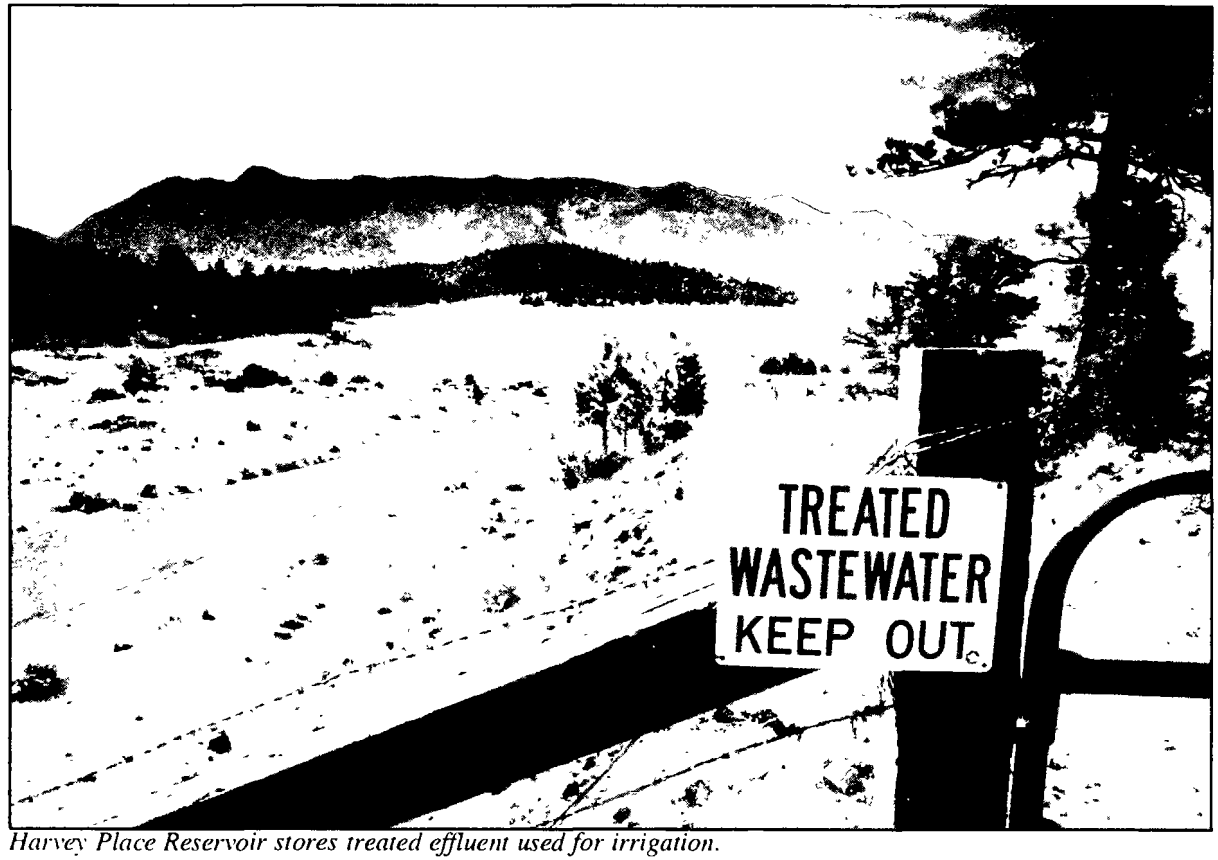


Water from the Marlette Lake system was transported to a regulating reservoir in the Virginia Range, from which it was served to the users.

The Special-Purpose Reservoirs

Two reservoirs in the upper watershed in California were constructed because of a rather unique need — Indian Creek and Harvey Place reservoirs.

Reference to Figure 1 will show that the Lake Tahoe basin is adjacent to the Carson River watershed. Disposal of treated waste water was banned within the Lake Tahoe basin as a means of helping to protect the lake's famous clarity.[1] Local agencies responsible for treatment were required to export their waste water from the basin. Waste water is today exported from several sites in the basin — going either to the Truckee River watershed downstream of the lake, or to the Carson watershed.

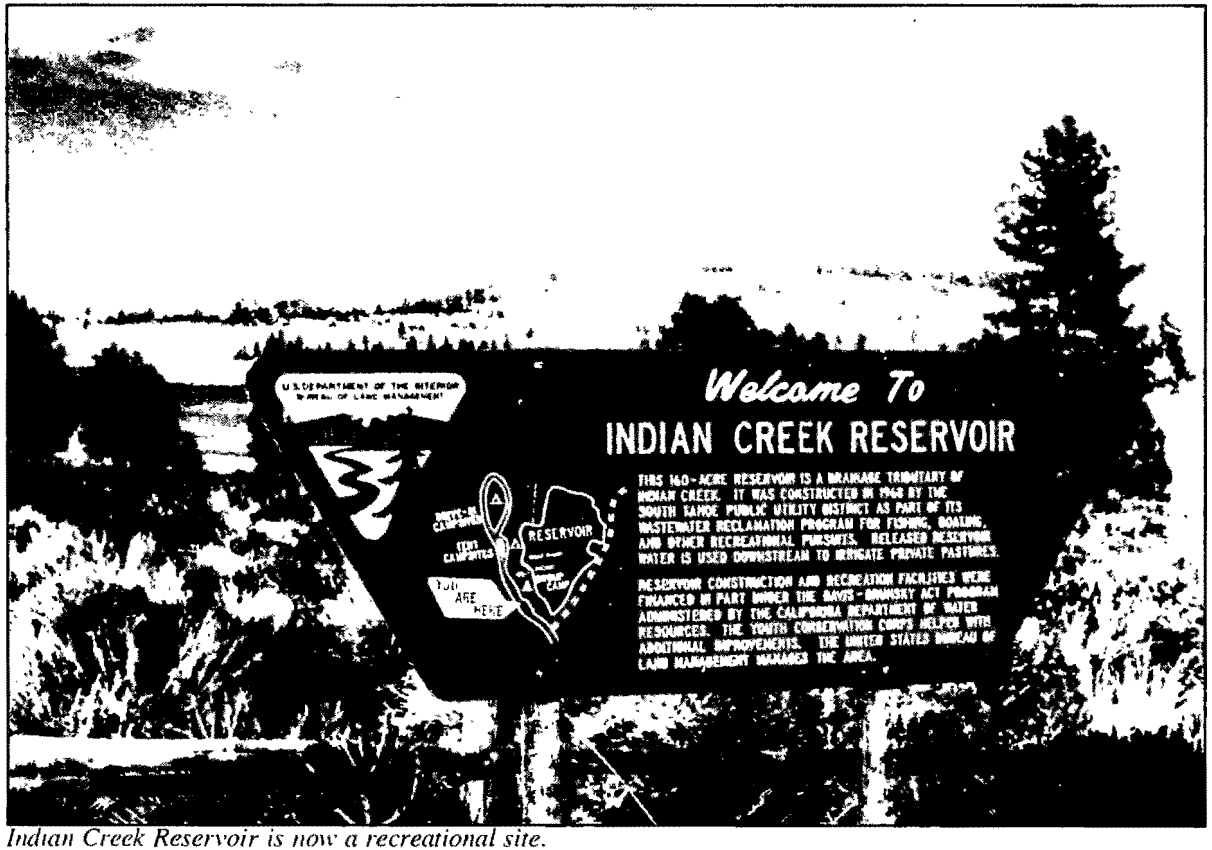


Harvey Place Reservoir stores treated effluent used for irrigation.

The largest export to the Carson comes from the southern end of Lake Tahoe, where South Tahoe Public Utility District conveys treated effluent in a pipeline over Luther Pass into Alpine County. This export began in the 1960s, when the water was delivered to Indian Creek Reservoir, constructed especially for this purpose. The water was then delivered from the reservoir to selected agricultural users for a supplemental irrigation supply. Harvey Place Reservoir, also constructed by South Tahoe PUD, became operational in 1989. Effluent exports (amounting to about 4,000 to 5,000 acre-feet per year in recent years) now go to Harvey Place Reservoir; Indian Creek Reservoir is used for freshwater recreation.

Operation of these reservoirs is controlled by agreements between South Tahoe PUD and Alpine County, and use of the effluent for irrigation is limited to specified areas. The following excerpts from a 1983 document known as the "Second Amendment to Agreement between South Tahoe Public Utility District and the County of Alpine and the Alpine County Water Agency" give an example of the requirements:

1 Regulatory agencies were concerned that the nutrients in treated waste water would increase the lake's algae population, hence reducing its clarity.



Indian Creek Reservoir is now a recreational site.

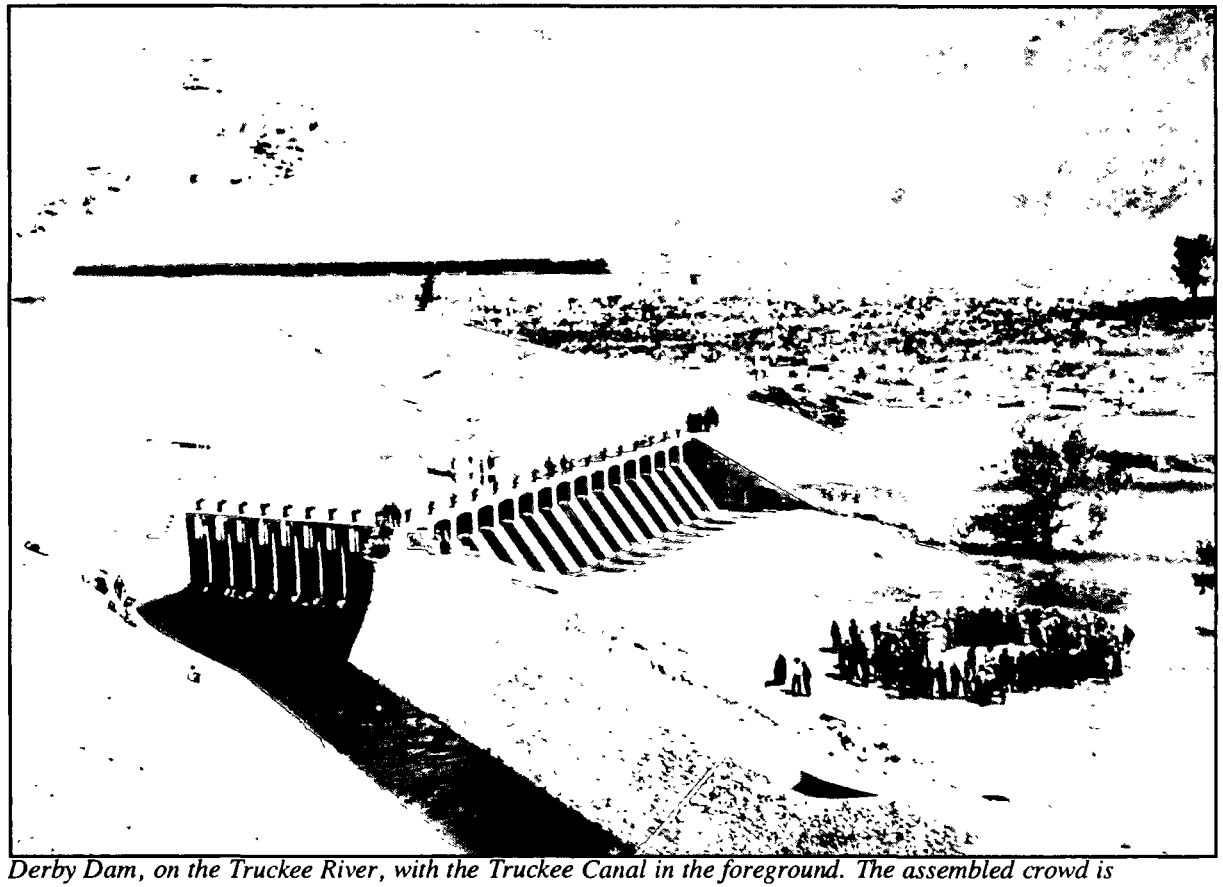
"District may discharge filtered advanced secondary waste water through said modified Indian Creek Pipeline and constructed transmission facilities to Harvey Place dam and reservoir, store waste water in said dam and reservoir and discharge said waste water to and on the lands now owned by.... Said waste water and discharge shall meet the requirements established by the California Regional Water Quality Control Board, Lahontan Region, the California Department of Public Health, and approved by the Environmental Protection Agency, or their successors in interest. The District may discharge up to 6,800 acre feet per calendar year of filtered advanced secondary waste water through said Indian Creek Pipeline into Alpine County. All discharge of filtered advanced secondary treated waste water to lands within the boundaries of County and Agency shall be by written contract with the landowner upon whose lands discharge is made, which written contract shall be approved by County and Agency.

"District shall change Indian Creek Reservoir waters from tertiary treated effluent waters to West Fork Carson River and Indian Creek waters, change said reservoir to a fresh water reservoir and maintain the quality of said reservoir's water suitable for fresh water recreational purposes. District shall further maintain said reservoir as a fresh water trout fishery by delivery for planting of catchable size trout in the amount of 15,000 pounds annually."

Lahontan Reservoir and Newlands Project Facilities

Lahontan Reservoir is the centerpiece of the Bureau of Reclamation's Newlands Project. The reservoir is impounded by a 162-foot-high earthfill dam and has a storage capacity of 314,000 acre-feet, or 317,300 acre-feet if flashboards are installed on the spillway crest. The reservoir was designed to contain the entire flow of the Carson River reaching the damsite as well as water diverted from the Truckee River[1] via the Truckee Canal.

Construction began immediately after passage of the Reclamation Act of 1902, with Derby Diversion Dam on the Truckee River and the 32.5-mile-long Truckee Canal being among the first facilities constructed.[2] Lahontan Dam was completed a little over a decade later, in 1915. A hydropower plant with a capacity of 1.92 megawatts was installed downstream of the dam, and transmission lines were constructed by Truckee-Carson Irrigation District to supply power to the surrounding rural area, including Fallon, Fernley, and Stillwater. This system provided the first electric power in this rural area. The dam and other facilities of the Newlands Project are operated by Truckee-Carson Irrigation District under contract to the Bureau of Reclamation. The irrigation district has constructed additional facilities in the service area, including parts of the electrical power distribution system, additional canals and drains, and some small regulatory reservoirs.



Derby Dam, on the Truckee River, with the Truckee Canal in the foreground. The assembled crowd is there to witness the first water being turned into the canal. This view is taken looking toward today's U.S. Highway 80, which would parallel the railroad tracks in the background.

1 Details of Truckee River water supply to the Newlands Project are described in the Department's *Truckee River Atlas,* June 1991.

2 Derby Diversion Dam regulates releases of water from the Truckee River into the Truckee Canal, which has a capacity of about 900 cubic feet per second.

U S Bureau of Reclamation Carson City

A view of Lahontan Dam from the downstream side. Note the twin spillway sections, and also the powerplant on the right side of the photo.

The Newlands Project was designed to irrigate lands in Lahontan Valley that appeared to be arable but had the limited rainfall characteristic of a high desert. Since flow in the Carson River alone was not sufficient to irrigate this land, water from the Truckee River was diverted to increase the acreage that could be irrigated. Today the single largest use of water on both the Truckee River and the Carson River is still Newlands Project irrigation.[1] Continued diversion of Truckee River water to the Lahontan Valley has been the subject of the long-standing litigation and controversy described in Chapter 5.

The Name Behind the Newlands Project

The name "Newlands Project" seems appropriate for the first project under the Reclamation Act of 1902, particularly considering that, at the time, the mandate of the Reclamation Service (now the Bureau of Reclamation) was to make the desert bloom. The project was not, however, so named because it created new lands. It was named after Nevada's U.S. Senator Francis G. Newlands.

Nevada was experiencing an economic downturn after the Comstock Lode silver boom collapsed. Newlands, believing agricultural development was the key to the state's future, began advocating irrigation projects as early as the 1880s. He purchased land near the present dam at Lake Tahoe so that a new dam could be constructed there to supply water to Nevada. This effort did not come to any fruition because of conflicts with existing water users — primarily hydropower and lumber interests. Later, as a member of Congress (first as a representative, then as a senator), Newland's support of the Reclamation Act ensured that Nevada's first such project would be named for him.

1 A small portion of the project is in the Truckee watershed near Fernley, but most of the irrigated acreage lies in the Lahontan Valley.

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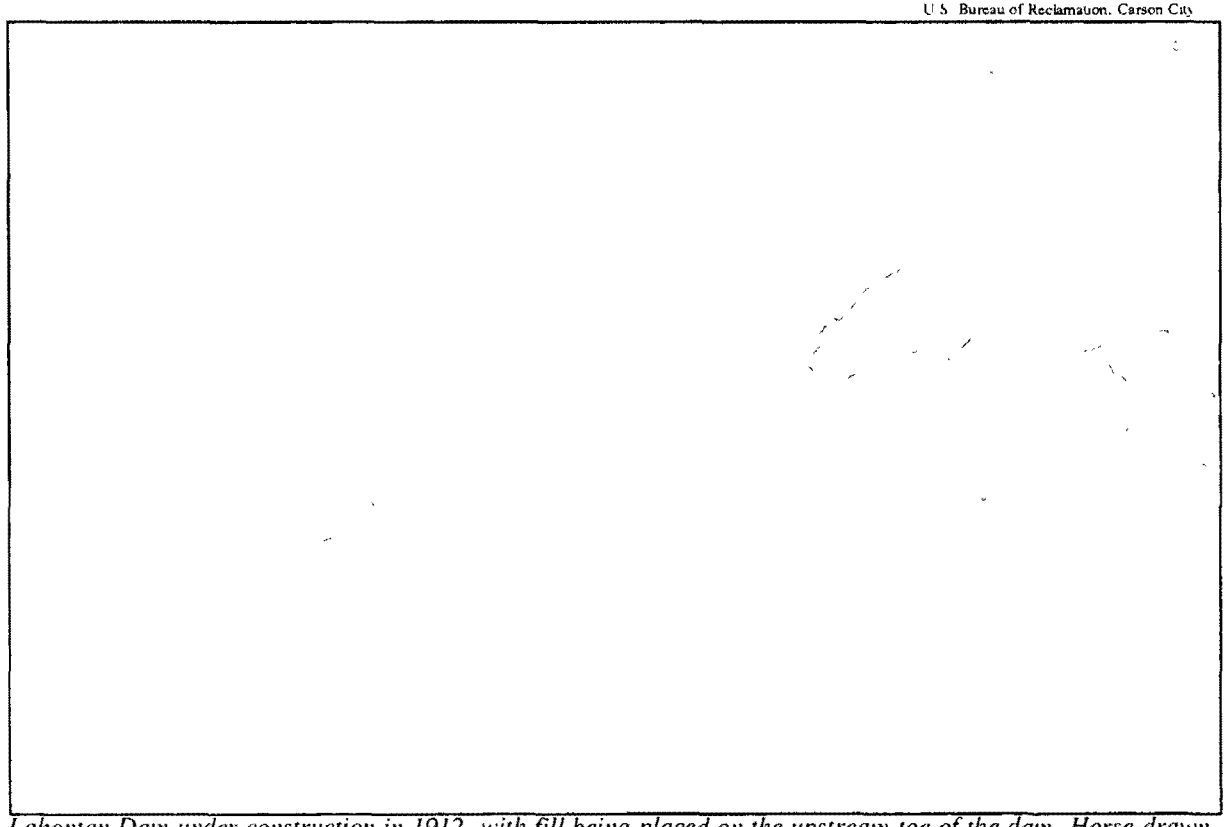


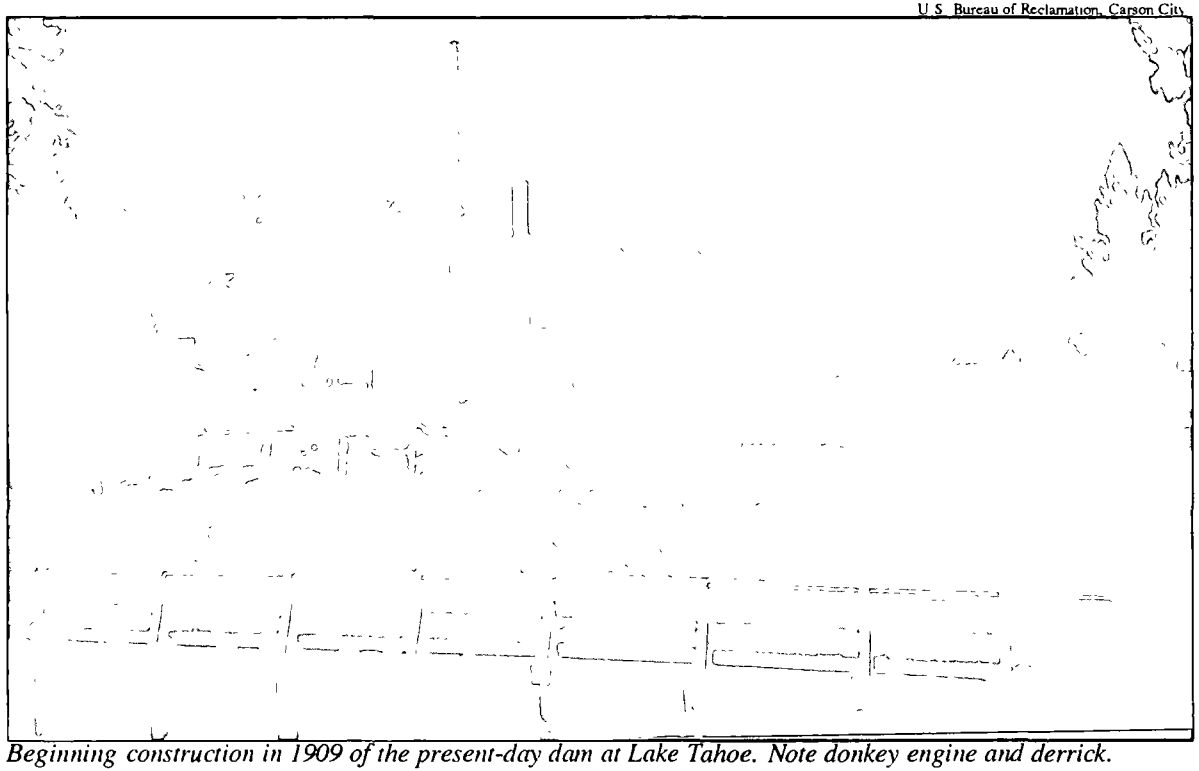
Lahontan Dam under construction in 1912, with fill being placed on the upstream toe of the dam. Horse-drawn scrapers are working alongside a steam-powered roller.

Lake Tahoe, in the Truckee River watershed, is actually the largest storage facility of the Newlands Project. Tahoe is a natural lake that was converted into a reservoir by construction of a small dam on its natural outlet to the Truckee River at Tahoe City. Construction of the existing small (18-foot-high) concrete slab and buttress dam was completed in 1913 by the Bureau of Reclamation and Truckee River General Electric Company, a predecessor of today's Sierra Pacific Power Company. In 1915, after a complex series of water rights litigation and negotiations (described in Chapter 5), the federal government obtained an easement to use and operate the dam.

The government's purpose in this action was to obtain the ability to use Lake Tahoe for Newlands Project agricultural water supply. Even though the dam is small by modern standards and controls only the upper 6.1 feet of the lake, it was very valuable to the agricultural water users because of the large surface area covered by the lake. The lake's upper 6.1 feet amounts to a usable storage capacity of 744,600 acre-feet, making Tahoe the largest reservoir in either the Truckee or Carson watershed. Water stored in the reservoir is released into the Truckee River in accordance with water rights decisions (covered in Chapter 5); the water is then diverted to Lahontan Reservoir via the Truckee Canal.

Waters from the Truckee and Carson rivers released at Lahontan Dam travel about 5 miles down the old river channel before reaching Carson Diversion Dam, a 23-foot-high concrete dam that diverts water into the two main canals, T Canal and V Canal, which carry the water to the extensive system of main canals and laterals. Once in the distribution system, the water can be regulated at several other small facilities, including Coleman and Sagouspe diversion dams and Sheckler, S-Line, and Harmon reservoirs. Truckee-Carson Irrigation District has constructed a small hydropower plant on the V Canal.

Additional facilities of the Newlands Project include a deep drainage system and the Carson Lake Pasture. The drainage system was constructed to combat the twin problem of saline and/or alkaline soils and a locally high ground water table. Ground water levels rose to near the ground surface in parts of the project area after construction, due to applied irrigation water and canal seepage, eventually creating perched water tables in some locations. The purpose of agricultural drainage is to prevent salt accumulation in the soil and to prevent crop roots from becoming waterlogged by providing a means to remove excess water and water applied to flush out salts. Much of the project's agricultural drainage water is used to supplement the water supply for wildlife areas at the Stillwater marshes.



Beginning construction in 1909 of the present-day dam at Lake Tahoe. Note donkey engine and derrick. Remains of old timber crib dam can be seen in the background.

Agriculture and the Economy

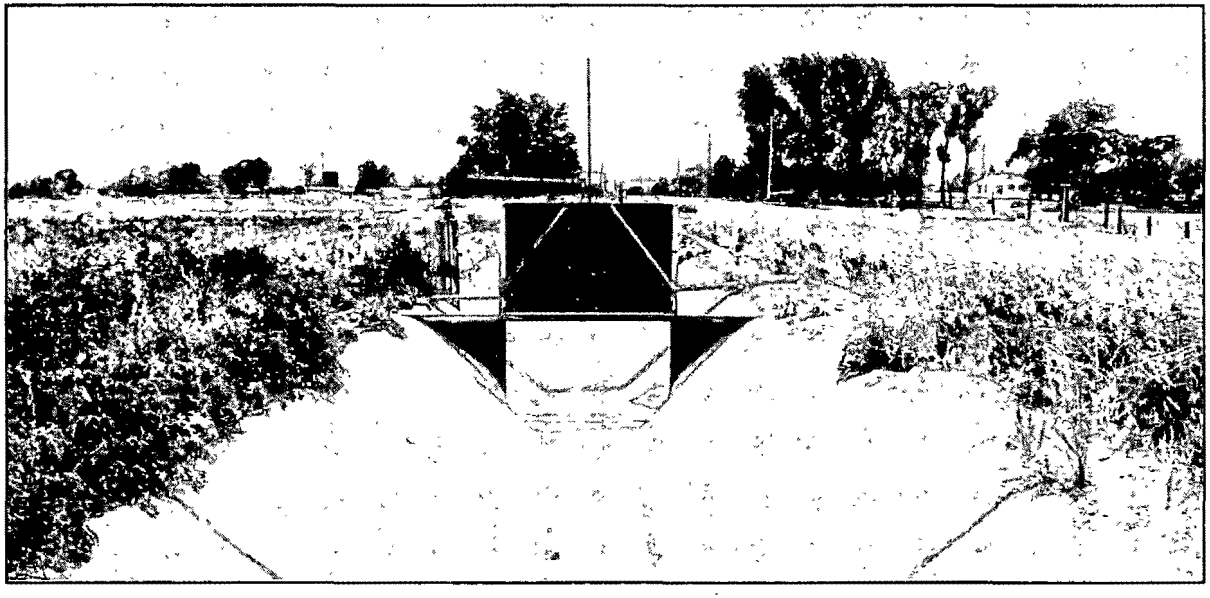
With the silver boom beginning to turn to bust, public opinion in Nevada increasingly focused on the need for agricultural development to support the state's economy. Dan DeQuille captured the prevailing opinions in his writings of the 1890s:

> *"Although until within a very few years past Nevada has never been thought of outside of the State as being anything else than a region of mines, of metals, and beds of minerals, it is now evident that she has agricultural advantages and resources long unsuspected. Nevada is well calculated to become a great stock-growing State.... the real and great business of the Nevada land owner must be stock-growing.... In order that the natural resources of the country may be properly utilized the greater part of the valley regions (nearly all at a distance from towns) must be given up to the stock-grower. He must have valley lands on which to raise sufficient hay and other feed.... When proper attention shall be given to the storage of water for irrigation it will be found that each valley will have sufficient capacity to produce hay, grain, and root crops adequate to the requirements of the flocks and herds that can find pasturage on the surrounding range."*

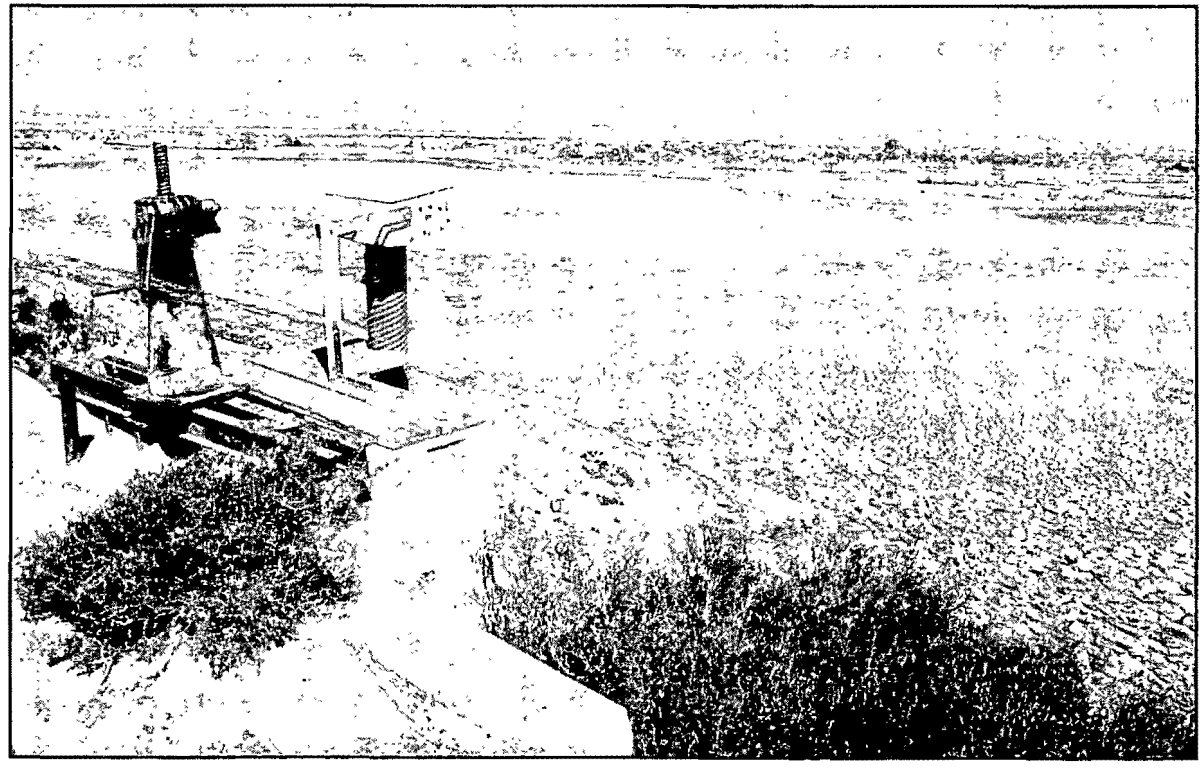
The Bureau of Reclamation created Carson Lake Pasture in about 1919 to provide a community grazing area for livestock owners. The Bureau withdrew a large area near Carson Lake from entry by settlers, fenced it for grazing, and provided for pasture irrigation. Revenues from grazing rents were intended to aid in repayment of Newlands Project costs. Today the pasture is operated by Truckee-Carson Irrigation District and is being managed for grazing and wildlife habitat (primarily for waterfowl and shorebirds) in cooperation with the State of Nevada. Under terms of the 1990 water rights settlement legislation (covered in Chapter 5), the pasture will be turned over to the state for use as a wildlife refuge.

U.S. Bureau of Reclamation, Carson City

Constructing the forms for outlet works at Lake Tahoe dam.



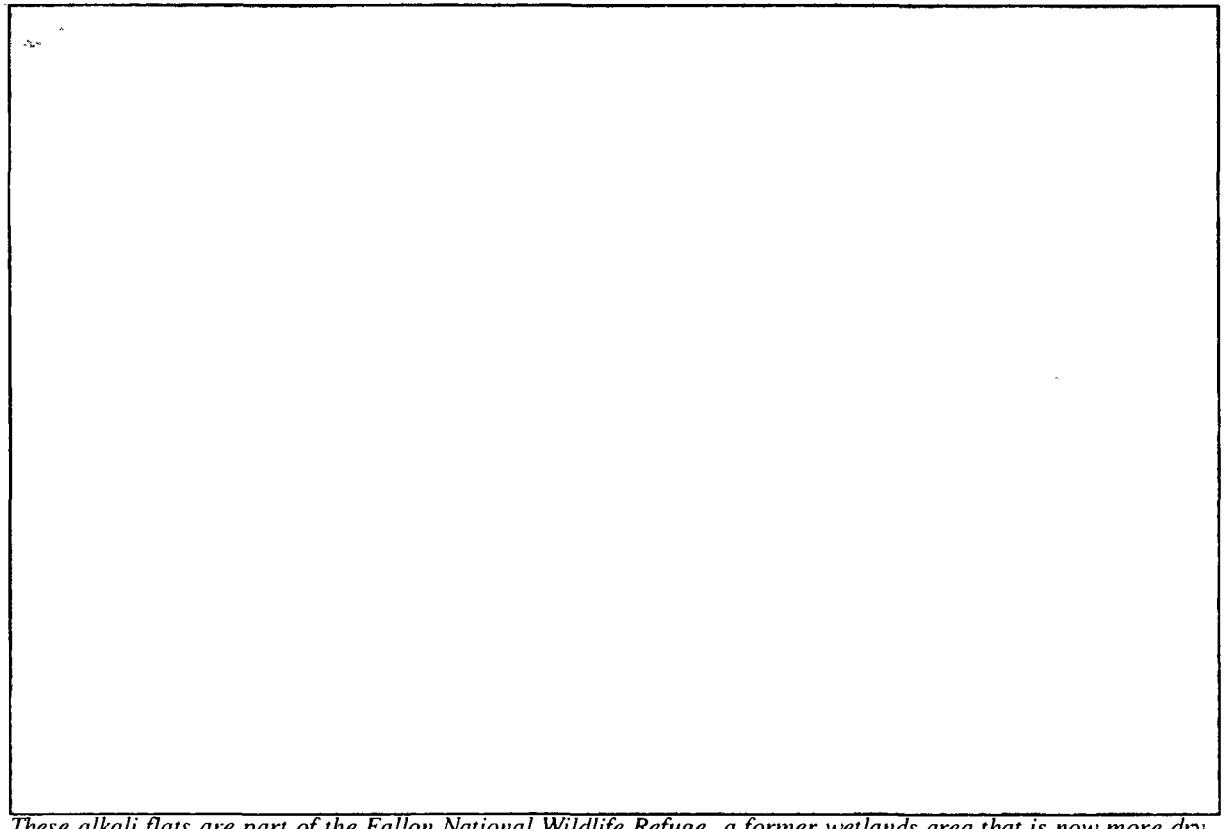
A typical part of the Newlands Project distribution system.



A dry Sheckler Reservoir on the Newlands Project. This small reservoir is used to help regulate water deliveries downstream from Lahontan Reservoir.

The Carson Sink Area

Although in part ephemeral, the lakes of the Carson Sink were the largest bodies of water in the Carson River drainage basin before the region's development for agriculture. In more distant geologic time, the sink area constituted part of Lake Lahontan, which once covered much of northwestern Nevada. Pyramid Lake to the north and Walker Lake to the south (both in adjacent watersheds) are modern remnants of Lake Lahontan[1] The former waterline of Lake Lahontan can be seen on the slopes of some of the mountain ranges surrounding Carson Sink. Prehistoric Indians living in the area thousands of years ago evidently took advantage of the food supply provided by a then-extensive marsh setting.

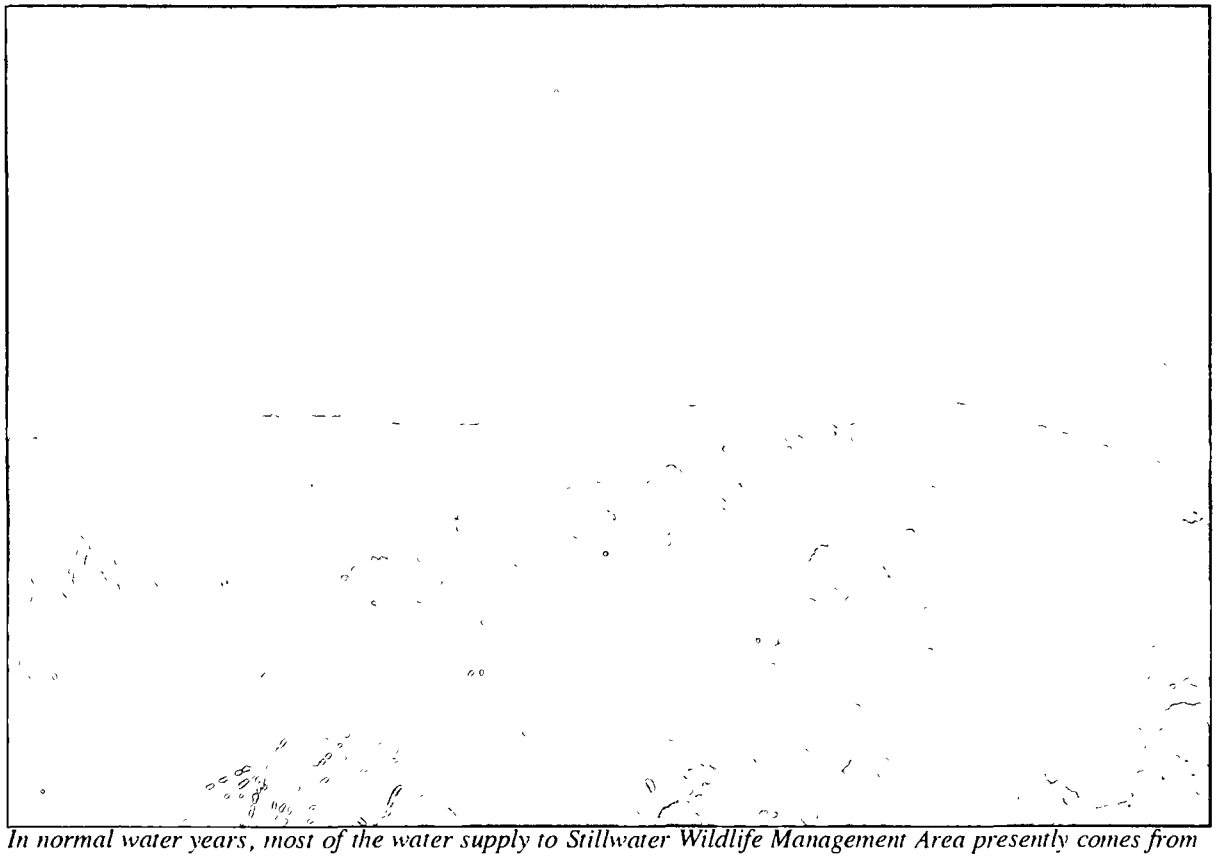


These alkali flats are part of the Fallon National Wildlife Refuge, a former wetlands area that is now more dry than wet.

Dan DeQuille has this to say about the northern part of the Carson Sink in the 1890s:

"The river then plows through the center of Douglas County into Ormsby, passing near Carson City, the capital of the State, thence into Lyon County, and finally finds its terminal 'sink' in Carson Lake, in Churchill County. This lake has an outlet several miles in length into a second lake, or sink, which at times of great freshets is united with the lower sink of the Humboldt, as has already been mentioned. Carson Lake is circular in form and is about twelve miles long and eight or nine in width. It has a depth of forty or fifty feet, and its waters are quite sweet. The lower sink is about twenty miles long and from four to eight miles wide. Its waters, particularly toward the north end, where it is very shallow, are strongly alkaline. These lakes are at times resorted to by great flocks of all kinds of water fowl. It is a poor place for fish. Trout are not plentiful, and the other kinds — suckers and chubs — are soft and insipid."

1 A variety of geographic features in Nevada bear "Lahontan" as part of their names. The term was derived in recognition of explorer Baron La Hontan.



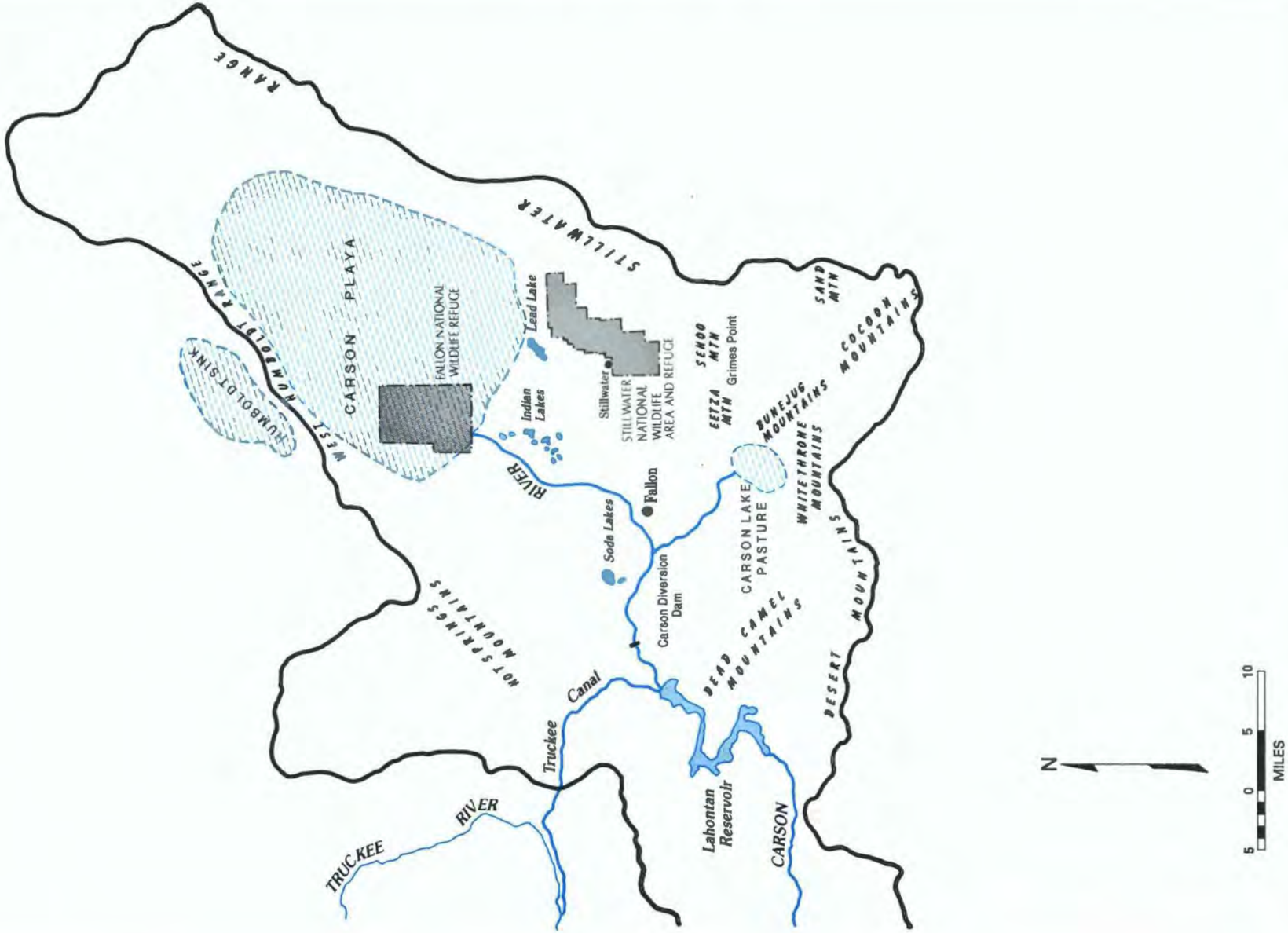
In normal water years, most of the water supply to Stillwater Wildlife Management Area presently comes from agricultural drain water.

Under natural conditions, the water level of a terminal lake or sink varies annually with inflow to the lake. In wet periods lake levels rise, and in dry periods they decline. In the case of a shallow sink in rather flat terrain, flow patterns are transitory and can vary from year to year. In years of normal runoff, the low-flow channels of the river may direct runoff to one portion of the sink. In wetter years, inflows may be large enough to spill over the banks of the low-flow channels and to take a different direction or to cut a new channel in the erodible sediments deposited in the sink. Runoff can also leave the small stream channels and spread over the land surface as sheet flow. As DeQuille noted, in the wettest years, water from Humboldt Sink to the north is commingled with Carson Sink water when flows are large enough to surmount the low topographic divide between the two sinks.

In their natural state, the lowlands within the sink had a relatively flat slope, with a microrelief characterized by scattered hummocks and sand dunes. Early settlers began altering drainage patterns when they leveled fields for cultivation, channeled runoff, and constructed irrigation and drainage ditches. Since the land surface is rather flat, even minor alterations can cause notable changes in flow directions. The amount of water reaching the sink has, of course, also changed (lessened) over time, because water has been put to use upstream. The region as described by early writers differs greatly from today's conditions, both in extent of wetland acreage and in flow patterns within the sink. To avoid lengthy explanations of changes in flow patterns over time, the term "Carson Sink" is used throughout this atlas to refer generally to the closed drainage basin and its individual sinks.

Three discrete wetland/former wetland areas constitute today's significant remnants of the marshlands that once characterized the historic sink. These wetlands and other significant geographic features are shown on Figure 5.

Figure 5
FEATURES OF THE CARSON SINK



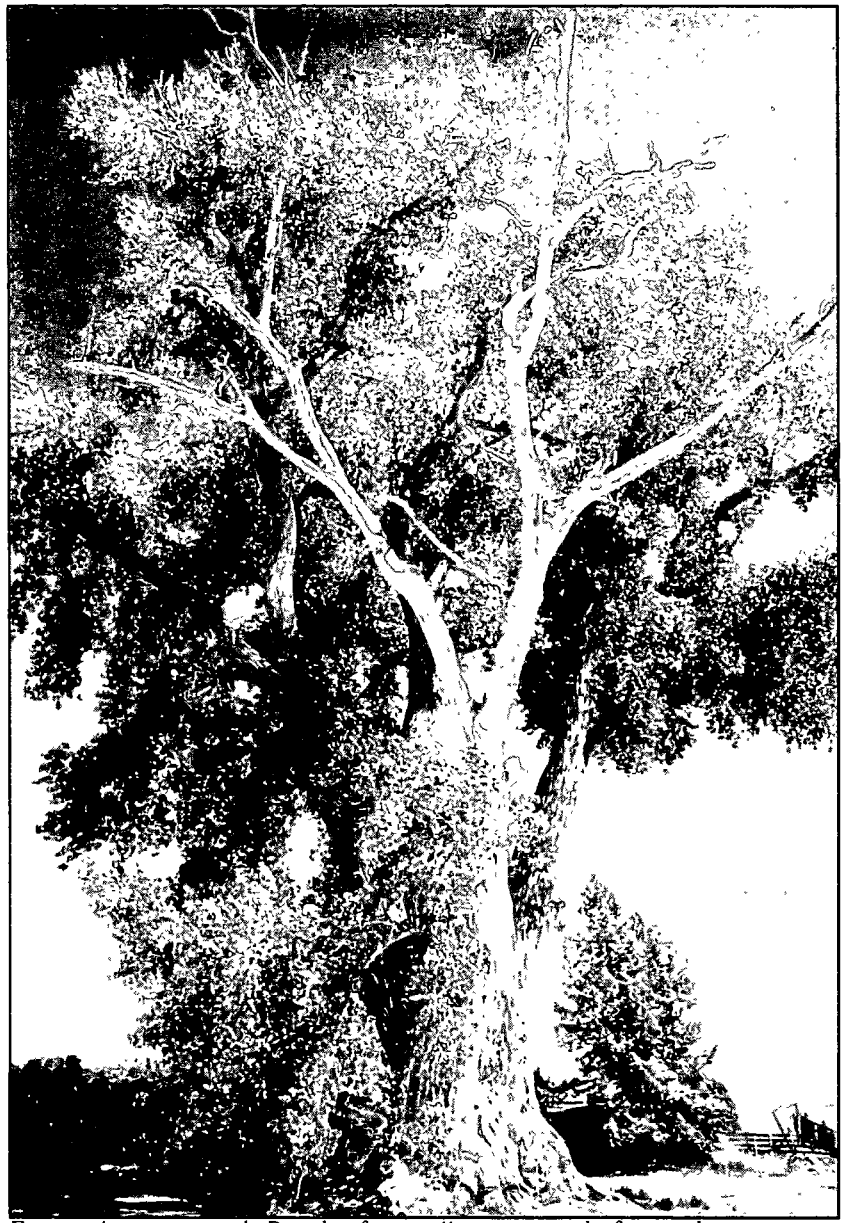
The alkali flats and sand dunes of the Carson Playa, at the extreme northeast corner of the basin, are characterized by sparse vegetation and an absence of water. Excess floodwaters reach this area only in extremely wet years such as 1986. Fallon National Wildlife Refuge is located on the eastern edge of this playa lake but normally does not receive enough water to sustain significant wildlife habitat.

The Stillwater area, to the south, consists of clusters of small managed wetlands, including the Indian Lakes area, Lead Lake, and Stillwater Point Reservoir. The Stillwater National Wildlife Refuge and Wildlife Management Area are divided into different management units (ponds and small lakes), where a system of dikes and water supply and drainage ditches has been constructed to regulate water levels in each unit. Whatever water supply is available to the Stillwater area, depending on hydrologic conditions, is managed to provide a variety of vegetation and habitat conditions for the avian visitors. The wetlands acreage has declined due to continued decreases in the amount of water reaching Stillwater; efforts to obtain more water for the wetlands are discussed in Chapter 5.

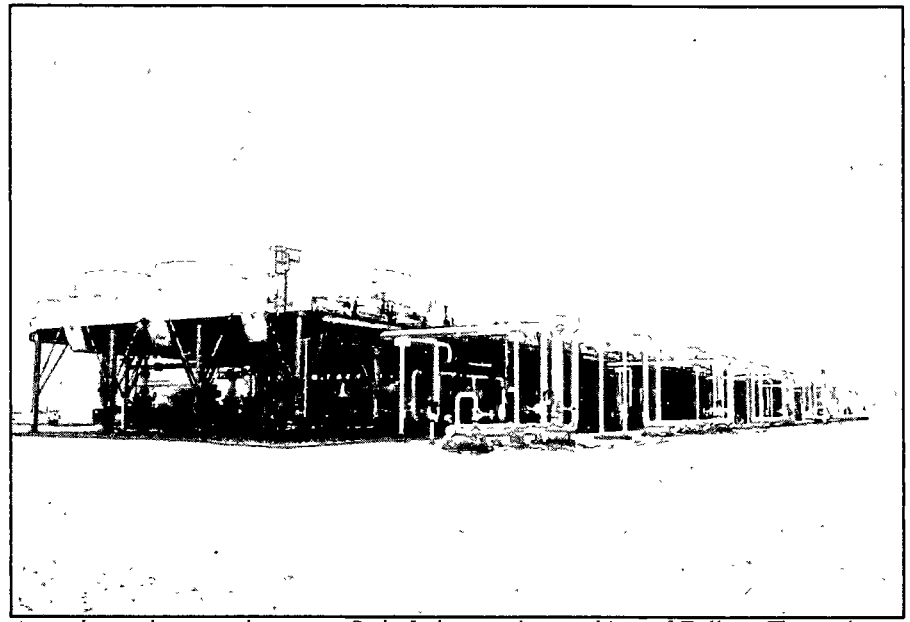
Carson Lake Pasture, farther south, is the third remaining wetland area. In the recent past, this area has been managed for both grazing and wildlife habitat. Like Stillwater, Carson Lake Pasture has been diked off into individual management units, and it too has seen a decline in wetlands acreage due to a decline in inflows.

Wetlands Water Quality Issues

New water quality concerns have arisen at Stillwater in the last few years, in addition to the usual concerns about the concentration of salts by evaporation typical in closed drainage basins. With the discovery of the selenium problems associated with agricultural drainage water at Kesterson National Wildlife Refuge in California, other refuge areas were scrutinized for similar conditions. (Stillwater receives some of its water supply from a system of drains which were constructed as part of the Newlands Project.) Preliminary sampling at Stillwater pointed to elevated levels of some trace elements, including: arsenic, boron, selenium, lithium, molybdenum, and mercury. Agricultural drainage alone may not be the source of all of these contaminants — mercury's presence in Carson River sediments reflects its substantial usage upstream in the Comstock mills, and other constituents such as arsenic are present in elevated levels in ground water. Stillwater lies on the edge of a geothermal resource area, as evidenced by the nearby geothermal powerplant. Ground water with elevated levels of minerals is common in geothermal zones; high arsenic levels in ground water used for municipal supply in the Fallon area has required the design of special water treatment processes. Ground water flowing into some of the agricultural drains may be the source of some of the contaminants reaching Stillwater. Studies on contaminant sources and mitigation are continuing today.



Fremont's cottonwood, Populus fremontii, was named after explorer John C. Fremont. It is one of only two trees native to the Carson Sink. The other is a willow. Cottonwoods and willows are found in areas of high soil moisture content, such as along creekbeds and on irrigated lands.



A geothermal powerplant near Soda Lake, on the outskirts of Fallon. Thermal waters often contain high levels of dissolved minerals, making the water unfit to drink.

Chapter 3

A CONFLUENCE OF RIVER BASIN INFORMATION

This chapter presents a brief overview of the climate, surface and ground water hydrology, and water quality concerns in the Carson River watershed. Readers interested in pursuing more detail on these subjects are encouraged to consult the references in Appendix 3.

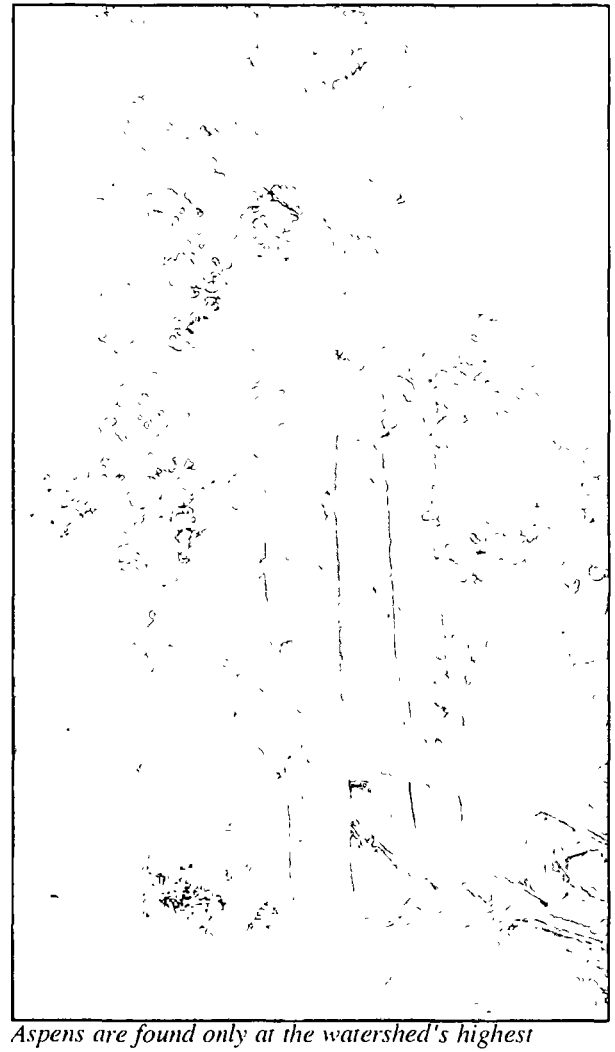
Climate

Elevations in the watershed range from about 9,000 to 10,000 feet in the Sierras, on the western edge of the watershed, to just under 4,000 feet in the valleys of the basin and range terrain toward the east. (Some of the highest peaks on the sierran crest include Sonora Peak (11,452 feet) and Stanislaus Peak (11,220 feet). Figure 6 shows contours of elevation in the watershed.

The high elevation areas in the Sierras are the coldest and wettest part of the region; the lower areas to the east lie in the rain shadow of the Sierras and are much more arid. The difference in precipitation levels from west to east is graphically demonstrated by the change in vegetation — from coniferous forests in the Sierras to sagebrush and alkali-tolerant grasses in the desert areas. Figure 7 is an isohyetal map of the watershed. (Isohyets are contours of equal average annual precipitation.)

The basin's climate is characterized by long, very cold winters, particularly in the Sierras, and by short, moderate to warm summers. Precipitation follows a seasonal pattern, primarily occurring from late October through early May. Summer thunderstorms are common but seldom produce significant amounts of precipitation over a wide area. Winter precipitation above the 5,000-foot elevation usually takes the form of snow. The spring runoff season lasts longer than is normal for watersheds of lower elevation, extending into early July, because the snowpack at the highest elevations melts late in the season.

Temperatures can vary widely in the region, as shown by the maxima and minima of record illustrated at the top of page 41. Normal winter lows in the Sierras routinely fall below freezing, while summer highs in the lower watershed exceed 100°F.



Aspens are found only at the watershed's highest elevations in the Sierras.

Figure 6
CONTOURS OF ELEVATION

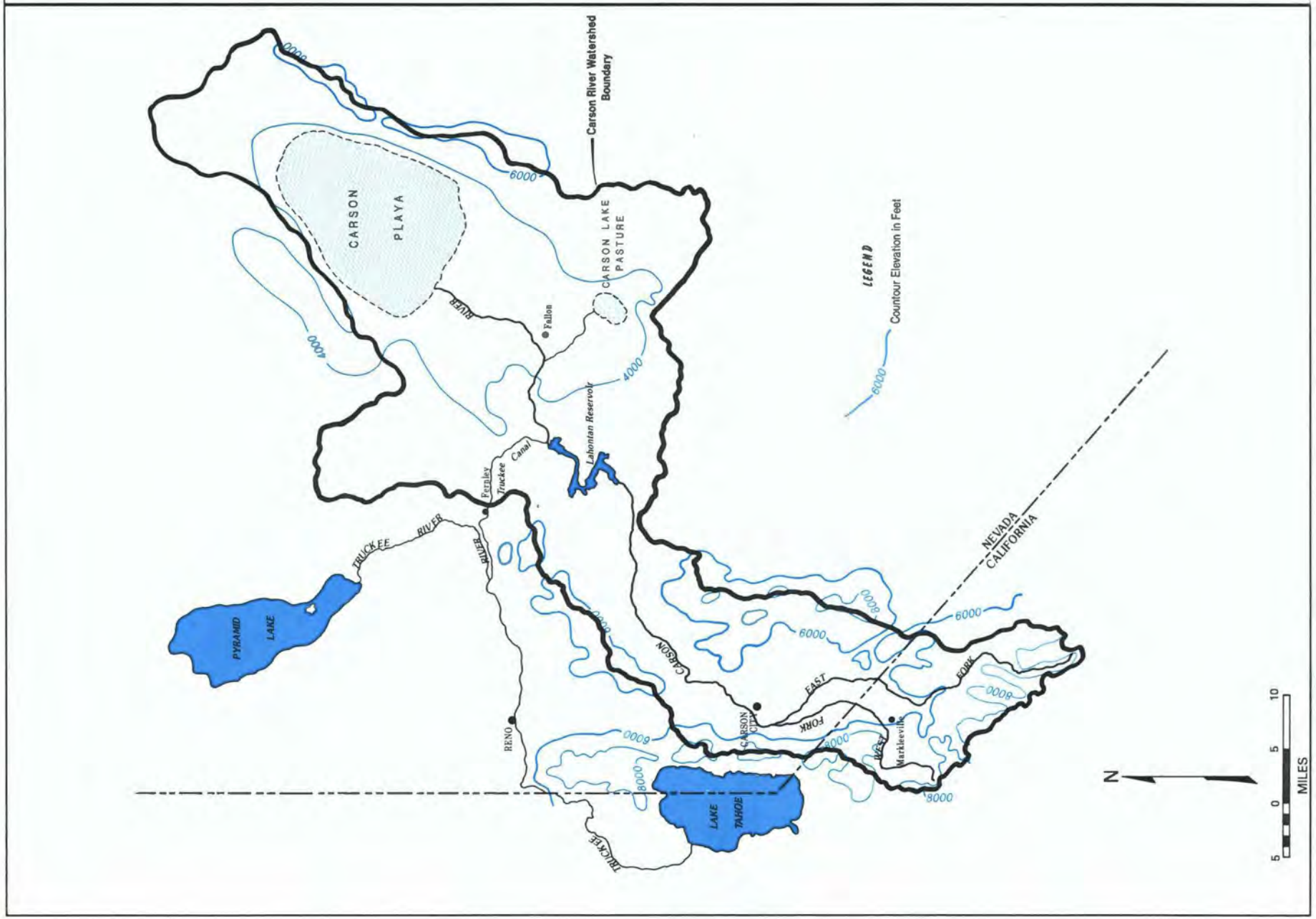
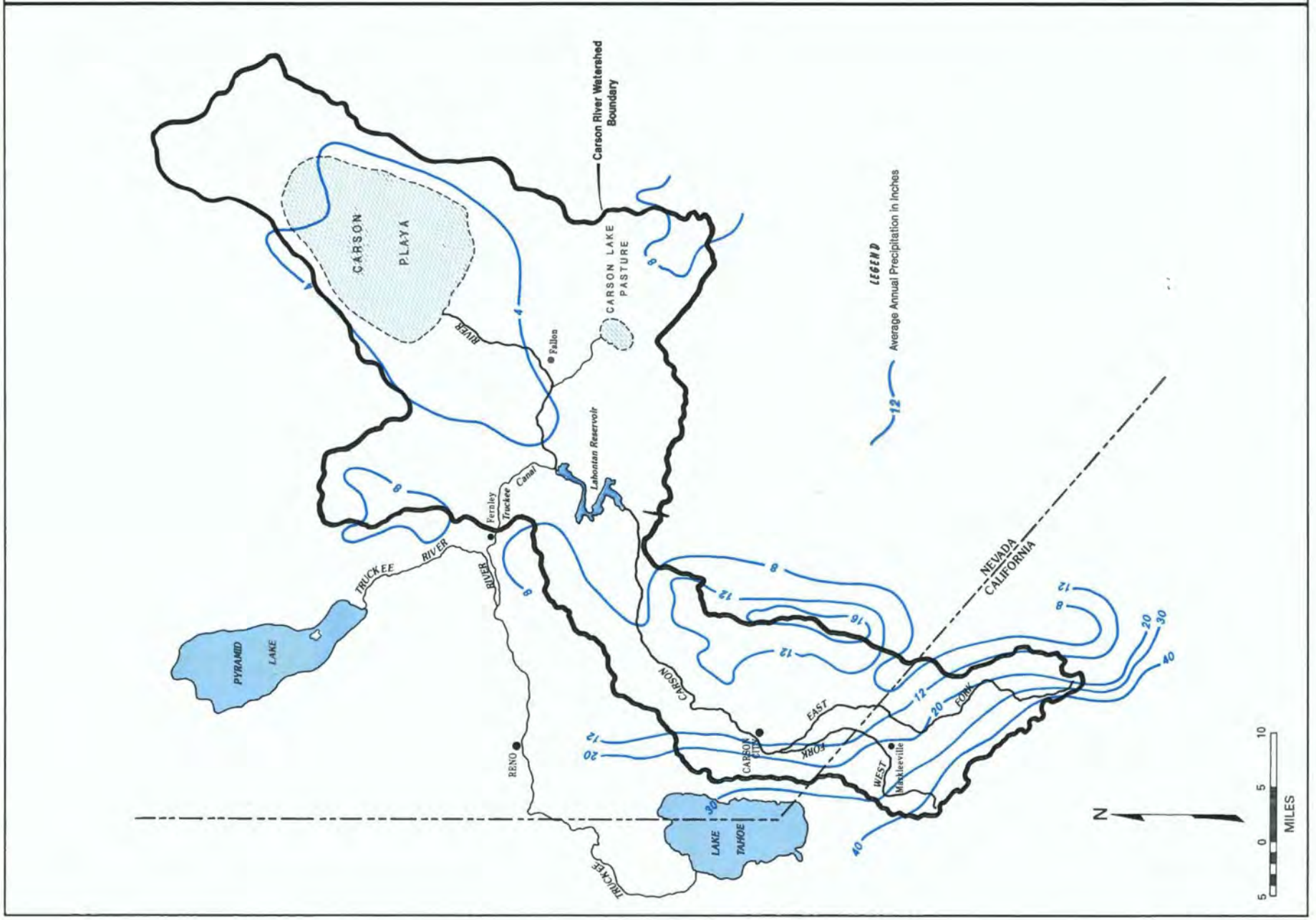


Figure 7
ISOHYETAL MAP



Snow Surveys

Dr. James E. Church of the University of Nevada is credited as being the inventor of modern snow surveying techniques. Dr. Church developed sampling equipment — the Mt. Rose snow sampler and scale — that, with modifications, remains basic tools of the trade.

The first application of Dr. Church's snow surveys was in the Lake Tahoe basin to the north. As Dr. Church worked on relating snow measurements to water supply conditions, he was asked if snow surveys could be used to predict the annual rise of Lake Tahoe due to snowmelt runoff. At the time, downstream water users — a hydropower company and the federal government on behalf of the Newlands Project — were operating Lake Tahoe to maximize the amount of water stored in the reservoir. This operation created a long-standing dispute between water users and property owners around the lake, whose lands were flooded when lake levels rose too high in the spring. Dr. Church made his first snow course measurements (a series of measurements at set points, where the water content of the snow is estimated) in the area surrounding Lake Tahoe in 1910. Ultimately his snow survey information was used to forecast the amount the lake would rise, so water users could operate the lake to limit flooding of shoreline property.

Today snow survey techniques are widely used to forecast runoff and water supply. Some survey data are still collected with sampling tubes invented by Dr. Church. New types of equipment, such as telemetering snow pillows, have been developed to augment manual data collection.

California and Nevada are both involved in cooperative snow survey programs, where a variety of entities — state and federal agencies, water districts, power utilities, and private organizations — jointly collect and share survey data and forecasts. In California, for example, the Department of Water Resources operates and maintains certain snow courses and telemetered installations and collects data from them during the winter to forecast supplies for the State Water Project. The Soil Conservation Service and the Bureau of Reclamation in Nevada use forecast data to estimate available water supplies for agricultural areas such as the Newlands Project.

Department of Water Resources snow surveyors measure the water content of the snowpack. This information is used in forecasting spring runoff.

Location	Maximum Temperature (°F)	Minimum Temperature (°F)
Markleeville	102	–22
Carson City	107	–27
Fallon	107	–25

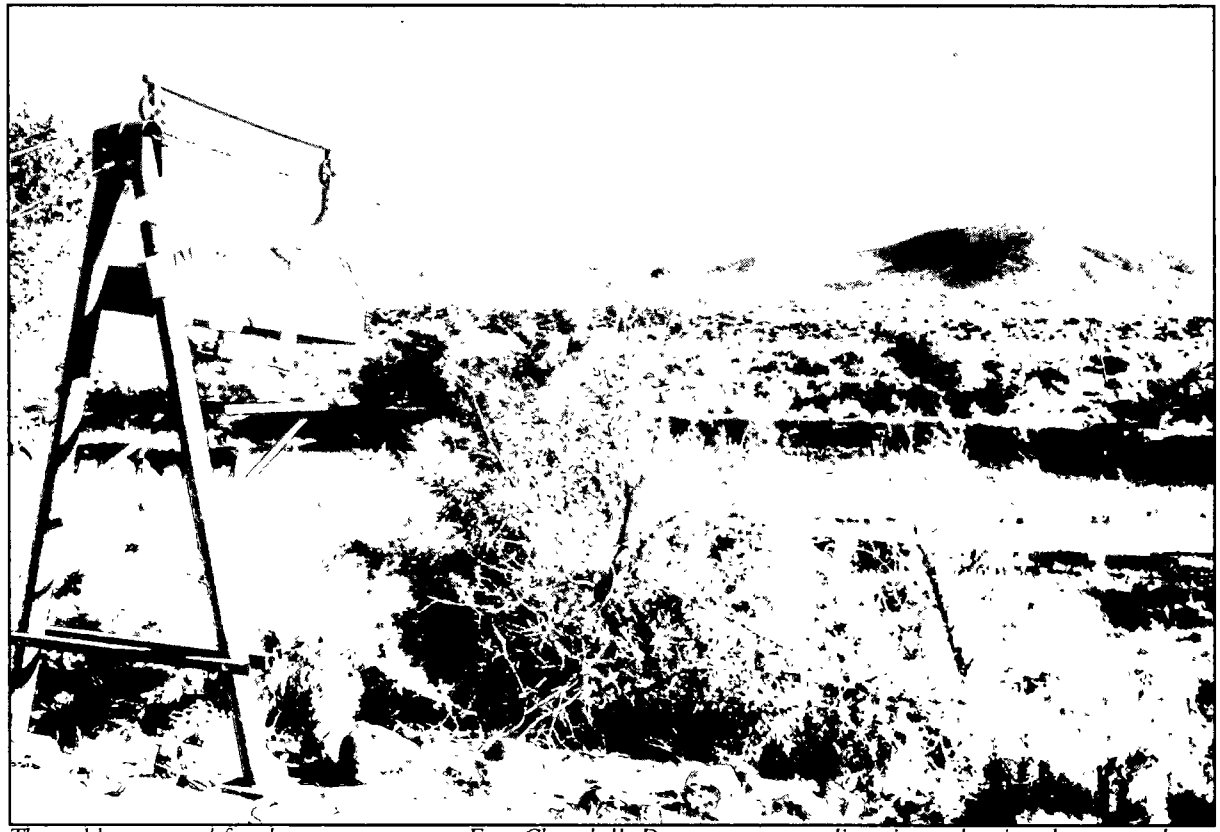
Another way of looking at climatic conditions is provided by the following table, adapted from U.S. Department of Agriculture information, which shows the number of frost-free days per year at selected locations in and near the watershed. This information is normally used to evaluate an area's agricultural potential or suitability for certain types of crops, but it also serves to indicate relative differences in climate.

Location	Elevation (feet)	Frost-Free Season (days)
Truckee	5982	30
Tahoe City	6228	77
Minden	4700	104
Carson City	4675	123
Reno	4397	129
Fallon	3965	150

Remote sensing of data is now being used to augment manual measurement of snow courses. This snow pillow, filled with an antifreeze mixture, will provide data to be telemetered to a remote computer system.

Surface and Ground Water Hydrology

Most runoff in the watershed is derived from the upper elevations in California, where precipitation is greatest. Figure 8 is a map of the watershed showing average annual flows at selected points along the river, based on U.S. Geological Survey stream gaging data. The river's greatest historical annual flow below the confluence of the East and West forks (measured at the Carson City gage) was 587,600 acre-feet in 1969, and the lowest was 42,320 in 1977. It is quite possible that larger or smaller events may have occurred before regular, detailed records were kept. The relatively reliable hydrologic data for this river system begins in the early 1900s at a few locations, although there were occasional scattered observations earlier. Thus we know from anecdotal accounts, for example, that a period in the late 1800s was much wetter than normal, although we do not have measurements of streamflow for this period.



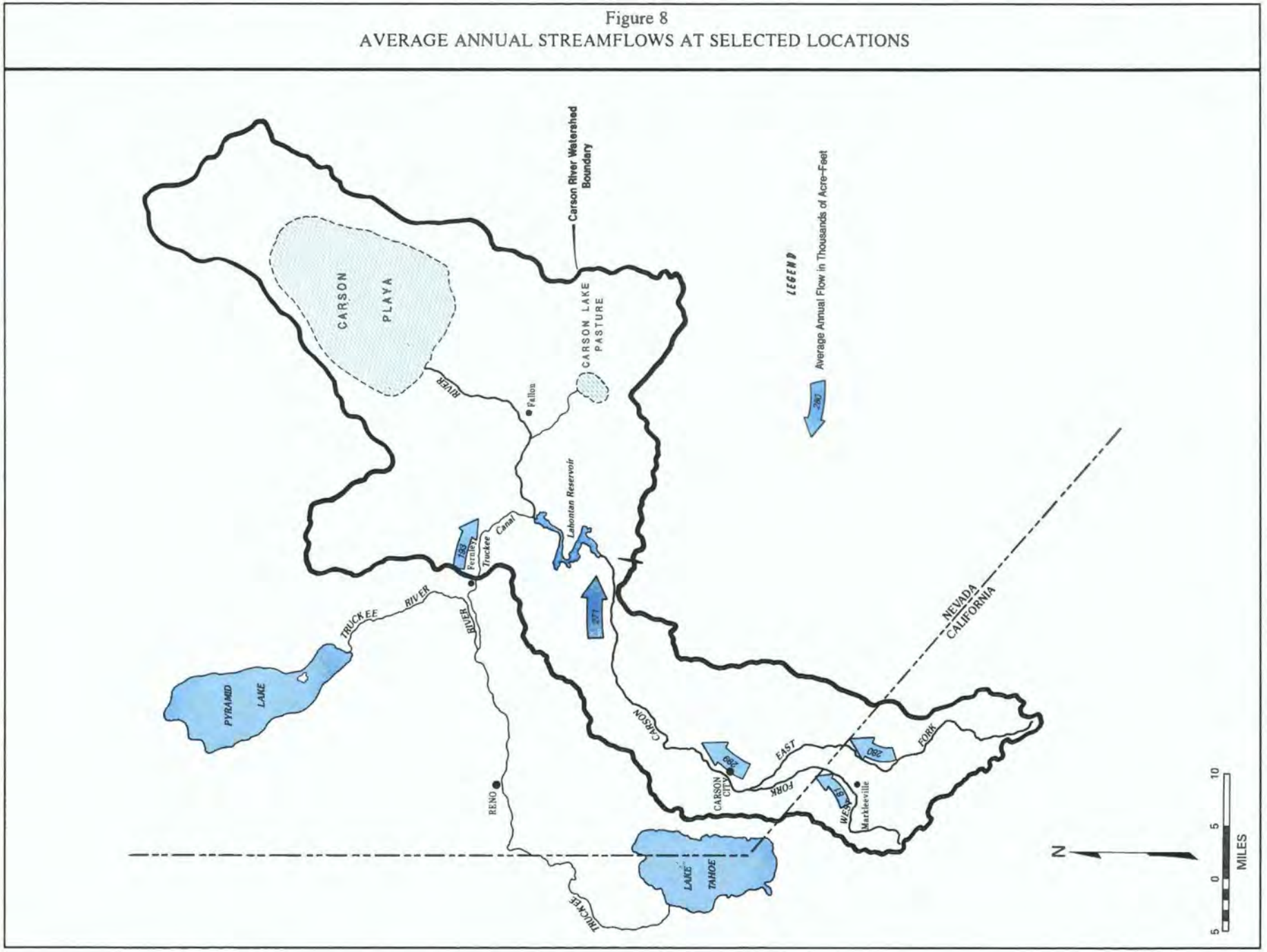
The cableway used for the stream gage at Fort Churchill. Due to upstream diversions, the river has gone dry at this location on a number of occasions.

In historical times, the most significant drought from a water supply perspective was from 1928 to 1934.[1] Lake Tahoe fell below its natural rim during this time, and Lahontan Reservoir was essentially empty, holding only 91 acre-feet in dead storage below the level of the outlet works. The Carson River near Fort Churchill has gone dry on a number of occasions because upstream diversions take all of the river's flow in dry years.

At the opposite extreme, the greatest floods of record occurred in 1955, when much of Northern California and Nevada experienced severe flooding. It was estimated that instantaneous peak flows were about 30,000 cubic feet per second at Carson City. Since the upper watershed is not regulated to provide flood control, large peak flows occur downstream. The developed areas along the sierran front — Carson City and the suburban

1 The drought of the late 1980s and early 1990s may surpass the 1928-1934 period in severity. At the time of this writing in 1991, the drought remains with us, and we do not yet have the complete hydrologic data to make a comparison with 1928-1934.

Figure 8
AVERAGE ANNUAL STREAMFLOWS AT SELECTED LOCATIONS



areas around Minden and Gardnerville — are particularly at risk, since they are affected by general river floods as well as by local floods on the small tributaries in the canyons above the communities (*e.g.*, Ash Canyon and Kings Canyon above Carson City).

Ground water provides a portion of the basin's water supply. Many private wells serve individual homes in the watershed, both in the alluvial valley-fill deposits (thought of as aquifers in the conventional sense) and in fracture zones in otherwise less pervious rock.[1] Generally such individual wells are outside the service areas of municipal water purveyors and are low-yield wells sufficient for the needs of a single dwelling. Most private wells in the basin are used for domestic purposes; irrigation needs are usually supplied by surface water.

The watershed's most important ground water basin is the Carson Valley, an interstate basin that is mostly in Nevada.[2] Early settlers found numerous artesian wells[3] in the valley; some wells are still artesian. Shallow ground water, within a few feet of the land surface, can be found in the unconfined aquifer in parts of the valley. Historically ground water has not been extensively developed here, although the increasing suburban population can be expected to create greater demands on the resource. The U.S. Geological Survey has been studying hydrogeologic conditions in this ground water basin over the last several years as part of its national water quality assessment program and is analyzing the possible effects of increased pumpage.

Historic Floods

As the watershed in Carson and Eagle valleys urbanizes, flooding can be expected to cause greater damage than in the past, when the area was predominantly rural. Early settlers were, however, also afflicted by floods, accounts of which were preserved in newspapers and other period materials. In 1973, the U.S. Department of Agriculture published a compilation of these records. This description of the floods of 1890 is excerpted from that publication.

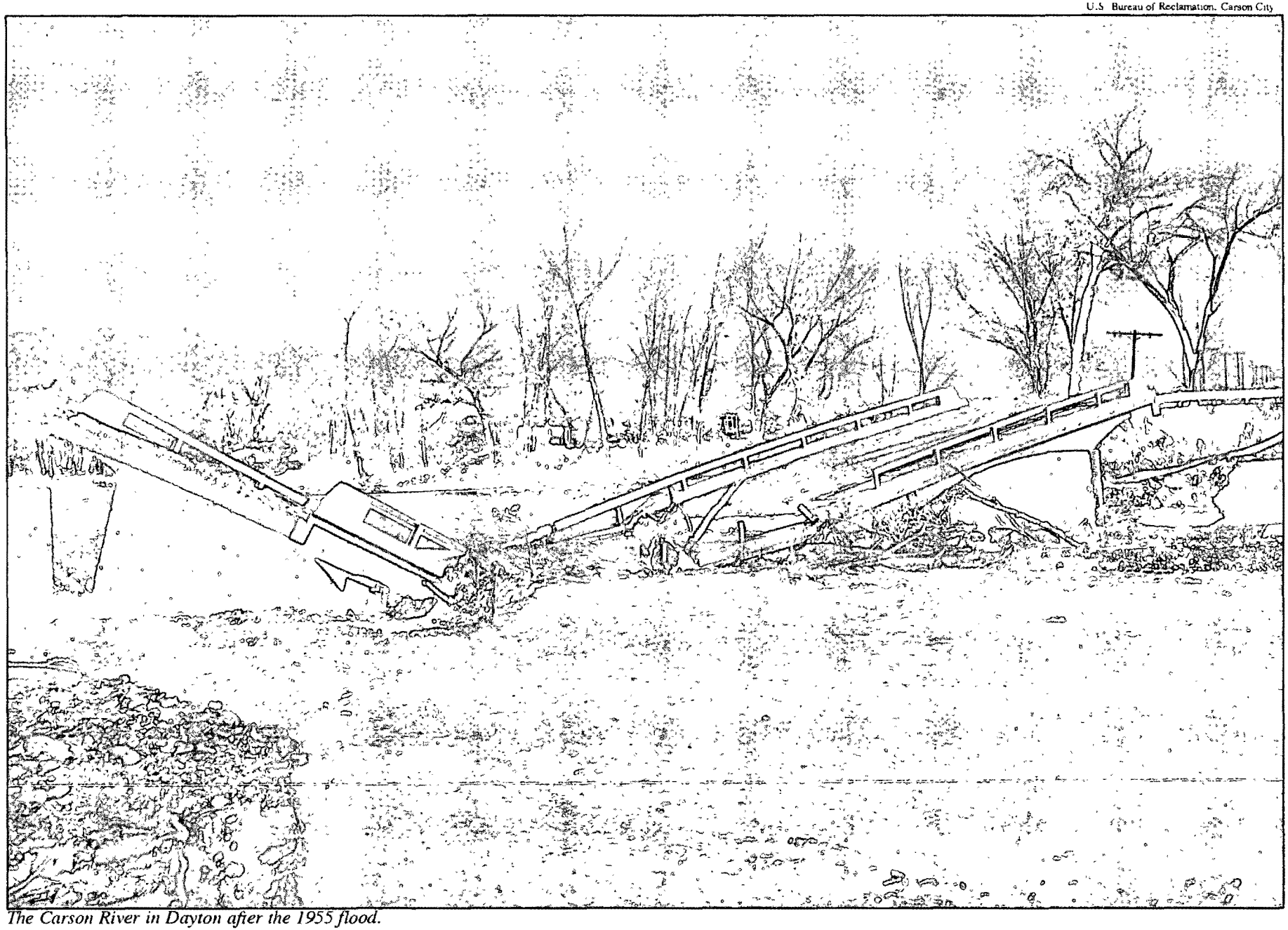
> *"An ice jam formed in the narrow gorge on the East Fork where the lumber and cordwood rafts were assembled each spring prepatory to the drive down the Carson to Empire. On January 25 the jam broke, and swept a 50-foot wall of broken cakes of ice, boom timbers from log rafts, logs, cordwood, et cetera, on down into Carson Valley. Another ice jam formed near the old East Fork School, on the south edge of Gardnerville. Cakes of ice one foot thick and the size of the side of a house were turned on edge, forming a dam 20 feet high. This ice barrier diverted the river from its channel where the channel gradient flattens out at the south end of the Carson Valley .... By January 28 affairs had become so perilous along this reach of the East Fork that it became necessary to blow the ice pack with dynamite, in order to get the river back into its channel south and east of Gardnerville.*
>
> *"On the upper Carson River and along the entire eastern Sierra escarpment, the snow piled into huge drifts. By the middle of February, it was learned that an avalanche had destroyed most of the buildings in the old town of Monitor (Loope), above Markleeville."*

1 In simple terms, an aquifer is a subsurface soil deposit or rock formation that is permeable enough that water can be economically withdrawn from it to serve some use. Carson Valley is a ground water basin (*i.e.*, an area underlain by water-bearing alluvium) where significant ground water development is possible.

2 Another large valley, Lahontan Valley, contains substantial amounts of water in storage, but poor water quality precludes major ground water development there.

3 Artesian wells tap a confined aquifer where the water is under sufficient pressure to cause it to flow upward to the ground surface.

U.S. Bureau of Reclamation, Carson City



The Carson River in Dayton after the 1955 flood.

Water Quality Constraints

In several areas of the watershed, impaired water quality limits the beneficial uses of surface or ground water. Some of these water quality constraints have occurred as a result of human activities in the watershed, while others are the result of natural geochemical processes. This section highlights the watershed's more significant areas of water quality concern.

In the upper basin, water quality constraints are primarily associated with former mining areas. The Leviathan Mine has had a long history of water quality impacts to surface water and corresponding pollution abatement efforts by the Lahontan Regional Water Quality Control Board (see sidebar). Acid mine drainage from this site has killed aquatic life downstream as far as Bryant Creek, which flows into the Carson River in Nevada and whose waters are used for irrigation.

The Lahontan Regional Water Quality Control Board is also investigating potential surface water quality impacts to aquatic life in the old Monitor-Mogul mining district, near the former townsite of Loope. As was common practice at the time much of this area was being mined, some tailing piles from milling the gold/silver ores of the district were simply dumped into Monitor Creek. Travelers on Highway 89 over Monitor Pass can still discern an erstwhile mill site in the creek bed, together with the accompanying tailing piles.

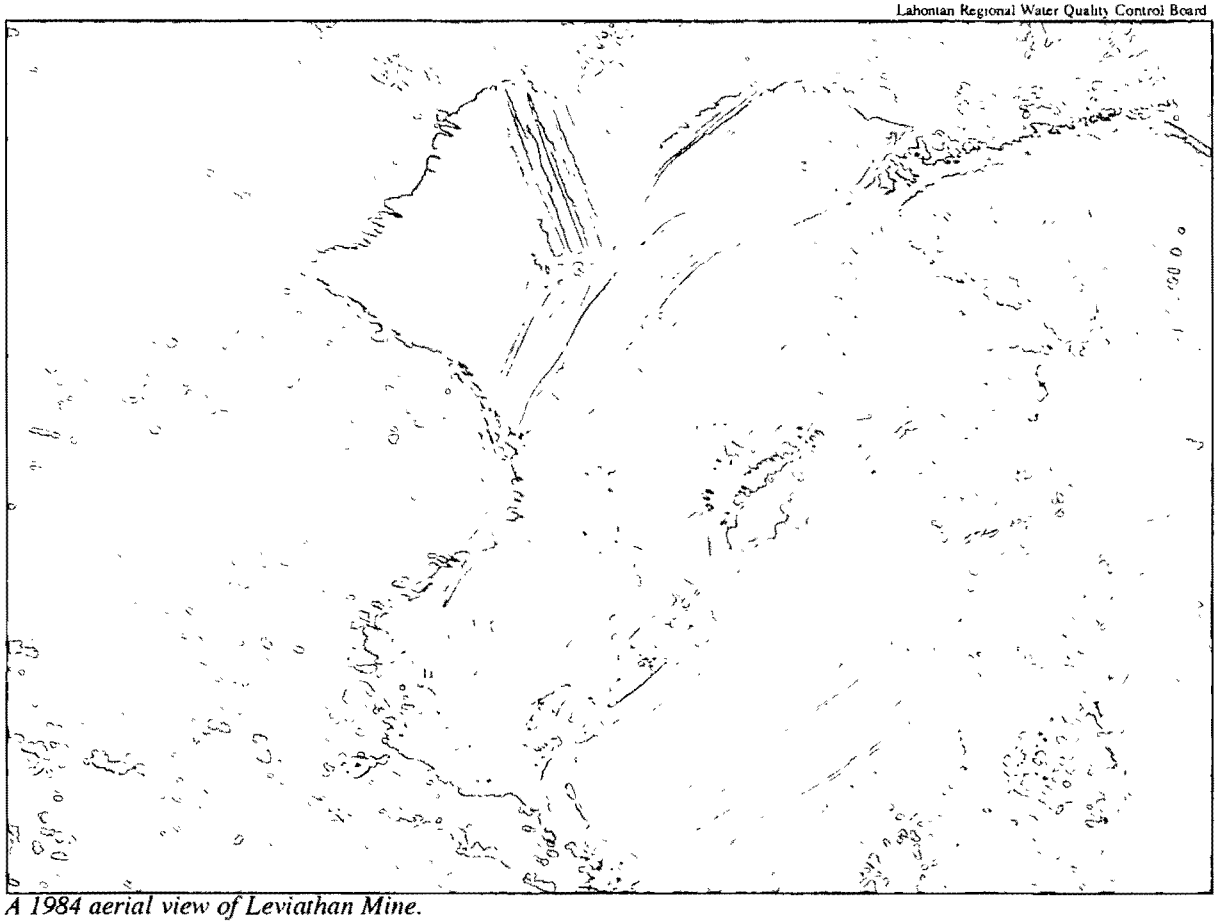
There is also a localized water quality constraint in the upper watershed, caused by elevated levels of minerals associated with thermal waters. The presence of Grover Hot Springs, just outside Markleeville, illustrates why wells in this area may not yield water of potable quality.

Impacts of past mining are again significant on the mainstem Carson River near Dayton, where elevated levels of mercury are found, remnants of past refining of Comstock ores. As evidenced by the photo on page 48, there

Leviathan Mine

The Leviathan Mine is on patented land surrounded by U.S. Forest Service holdings in a rather remote part of Alpine County about 2 miles north of the highway over Monitor Pass. The mine began in 1863 as underground workings for chalcanthite (a mineral whose chemical composition is copper sulfate) to be used in smelting the silver ores of the Comstock Lode. The mine was then briefly worked for copper ores, but copper production ceased when the deposit was depleted and a large sulfur mass was encountered. Mining for sulfur began in about 1935, but major production of sulfur did not occur until the 1950s, when it was mined and trucked to Weed Heights, in the Walker River watershed, for use in refining copper ore. The mine was converted to an open pit operation at this time, and tailings and overburden material were placed in or eroded into streams draining the workings. Pollution problems began, as evidenced by large fish kills. The mine was ultimately abandoned, leaving behind the large open pit (shown in the photo on page 47), waste and spoil areas, and surface water drainage and erosion problems. The Lahontan Regional Water Quality Control Board has taken enforcement actions against parties associated with the mining, and this site has been included on California's Superfund list of hazardous waste sites. The Regional Board has also funded some remedial work at Leviathan, primarily grading and erosion and drainage control. Typically, cleanup of large mines such as Leviathan is quite expensive because of the great extent of the disturbed area.

was once enough mercury amalgam in the riverbed to make dredging the river for amalgam profitable.[1] Mercury from the days of the Comstock is found in the remainder of the river downstream, including sediments in Lahontan Reservoir and in the Carson Sink. A portion of the Carson River in Nevada was proposed for inclusion on the Environmental Protection Agency's National Priority List of Superfund sites because of this mercury contamination. Elevated levels of mercury have been detected in the bodies of animals who are exposed to mercury-rich sediments, such as bottom-feeding ducks in the Carson Sink.



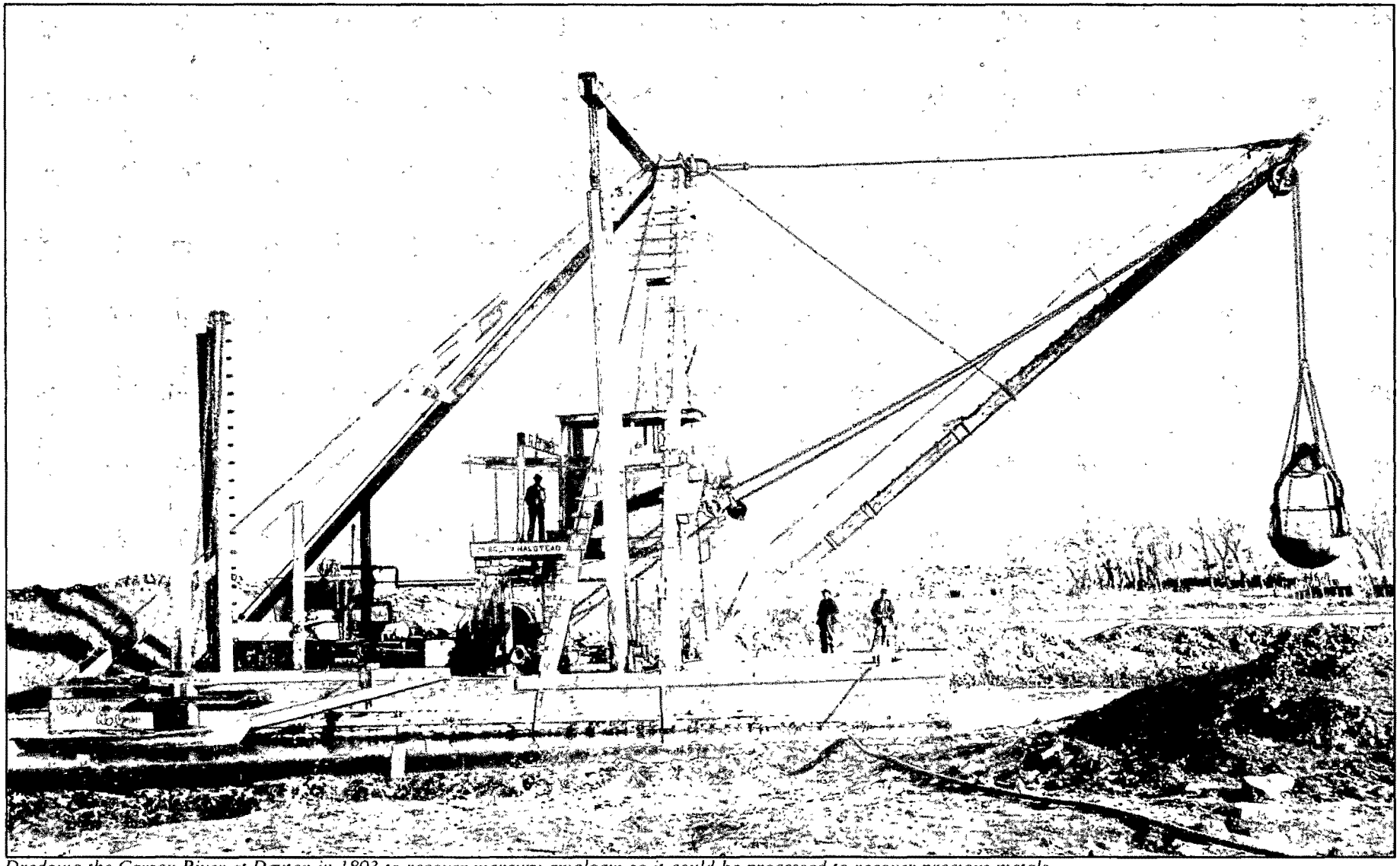
A 1984 aerial view of Leviathan Mine.

The Carson Sink area has additional water quality constraints on both surface and ground water. Surface water quality is affected by the concentration of minerals by evaporation and by agricultural drain water. Some of this drain water carries elevated levels of metals such as arsenic, believed to be associated with a nearby geothermal resources zone. Surface water tends to become increasingly saline as it flows through the sink, with the result that the quality of water reaching the wildlife areas is impaired for some uses. Ultimately, water too saline for further use in the wildlife areas is disposed of in evaporation ponds.

Ground water in shallow alluvial aquifers in the sink exhibits similar levels of mineralization, making the ground water not potable in most instances. Although a large volume of water is stored in Lahontan Valley, much of it is too saline or alkaline for domestic use. Ground water in a deeper basalt aquifer in the valley does support municipal use, although special treatment is necessary to remove arsenic. This aquifer contains elevated levels of naturally occurring arsenic, associated with the mineralized water of the geothermal resources zone.[2]

1 The amalgam, a mixture of mercury with other metals such as silver and gold, was then refined so that the precious metals could be salvaged.

2 Several sites in Lahontan Valley have been explored for possible geothermal power production. Powerplants have been constructed at two locations near Fallon.



Dredging the Carson River at Dayton in 1893 to recover mercury amalgam so it could be processed to recover precious metals.

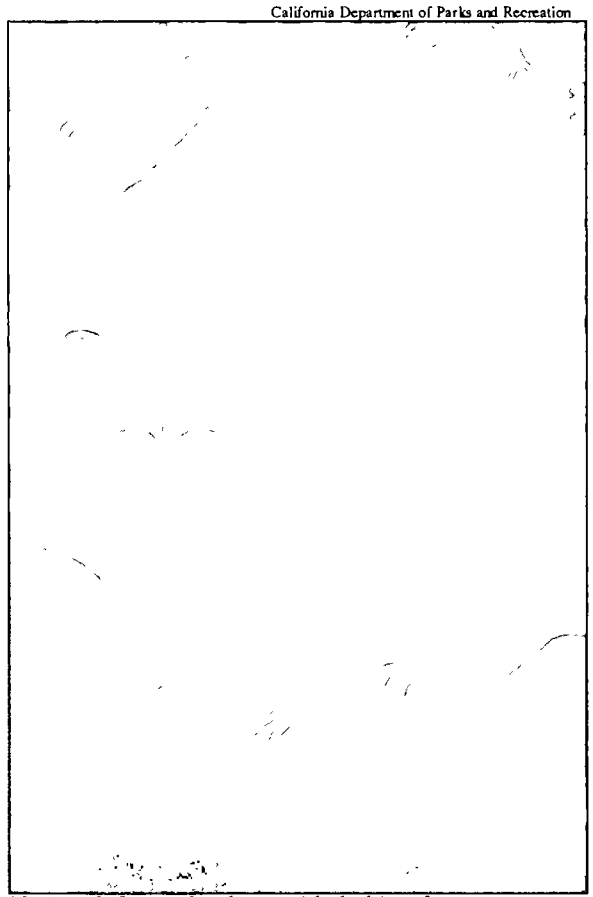
Chapter 4

DEVELOPMENT AND LAND USE

Urban development in the California portion of the watershed is minimal and is clustered around the towns of Markleeville (the Alpine County seat) and Woodfords. There are no incorporated cities on the California side of the watershed; local governmental services are provided by Alpine County, part of which lies within the watershed.

The population of Alpine County has remained relatively level over the past decade, hovering at about 1,000 (1,113 in the 1990 census), reflecting the sparsely inhabited nature of this mountainous region. Alpine County is California's least populous county and also has the lowest population density.[1]

More than 95 percent of the California watershed is owned by the federal government, primarily under the management of the Toiyabe National Forest. The Forest Service lands include portions of two wilderness areas — Mokelumne and Carson Iceberg wilderness areas.



National Forest lands provide habitat for many species of wildlife. This forest resident enjoys foraging in riparian corridors as well as at public campgrounds.

Recreation and government employment are the mainstays of the California region's economy. The area is popular for cross-country skiing, and the Forest Service lands offer hiking and camping opportunities. One popular activity is tracing the route said to have been taken by John C. Fremont and Kit Carson on their westward track through the mountains. The proximity of this area to Lake Tahoe lures many day visitors to the region. Agriculture and logging, the historic land uses after the mining boom ceased, are practiced on a smaller scale today. Most agricultural activities, primarily cattle grazing, occur on the only large area of private land ownership remaining in this part of Alpine County — Diamond Valley, at the head of the larger Carson Valley, which extends eastward into Nevada. Logging still occurs on Forest Service lands, but has diminished from its historical role as a significant component of the local economy.

1 Alpine County had a population density of 1.5 persons per square mile in the 1990 census; San Francisco had the highest density of California counties, at 7,474.2 persons per square mile.

A portion of the East Fork Carson River from Markleeville downstream to the stateline was recently added to California's Wild and Scenic River System. The California Wild and Scenic Rivers Act of 1972 requires that certain rivers possessing extraordinary scenic, recreational, fishery, or wildlife values be preserved in their free-flowing states. The act prohibits construction of dams, reservoirs, and most water diversion facilities on river segments included in the wild and scenic river system.

The Carson River watershed in Nevada includes parts of Douglas, Carson City[1], Lyon, Pershing, Storey, and Churchill counties. County boundaries are shown on Figure 9. Larger residential areas include the suburban Minden/Gardnerville area, Carson City, and Fallon. Like many communities in western Nevada, these communities have had high growth rates in recent years, as shown by the figures in the table at right. Smaller towns in the watershed, known for their historical character, include Virginia City, Silver City, Gold Hill, Dayton, and Genoa.

Land use in the Nevada portion of the watershed is varied. Residential and commercial development are concentrated in the areas mentioned above. Industrial development is less extensive here than in the Reno/Sparks area to the north, but the Carson City area does have some manufacturing and warehousing. Industries occupying the largest land areas include the Fallon Naval Air Station and several mines for commodities used in the construction and manufacturing trades.

Open Space Preservation in California

The percentage of federally owned land in Alpine County has been increasing recently, partly because of efforts by groups interested in preserving open space from future development. The area's proximity to Lake Tahoe and the concern that growth limitations in the Lake Tahoe basin would encourage residential/recreational development on agricultural lands in Alpine County have prompted land conservancy interests to seek potential land acquisitions. The intent was to seek out some of the mountain meadows that supported low-value agriculture — cattle grazing — and to facilitate the transfer of these lands to the Forest Service, either by acquisition of options or by outright purchases. Hope Valley, on the West Fork Carson River, is one location where former agricultural acreage has been turned over to the Forest Service.

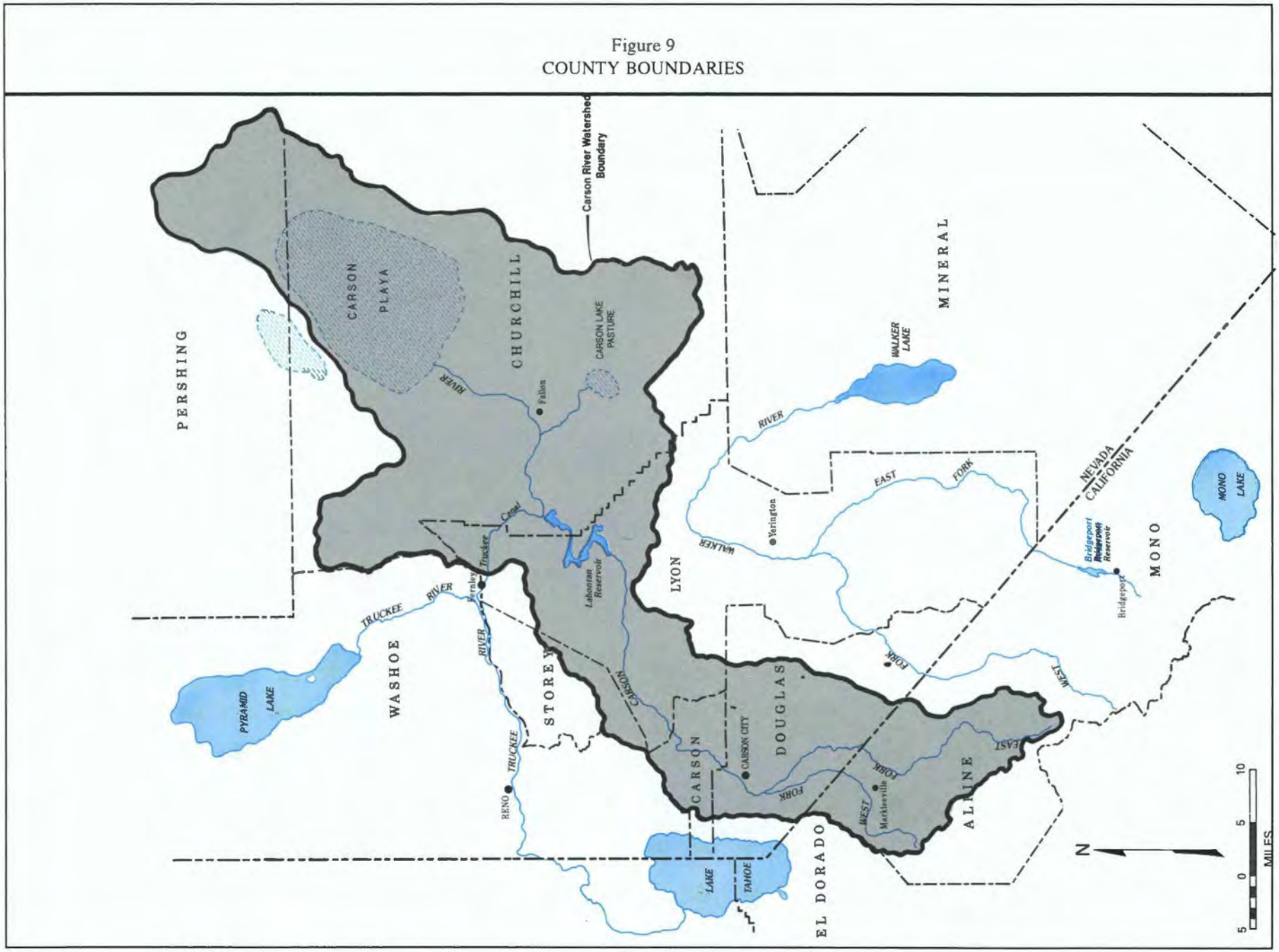
Population of Some Western Nevada Cities and Towns

City or Town	1980 Census	1990 Census	Percent Change
Carson City	32,022	40,443	26.0
Fallon	4,262	6,438	51.1
Reno*	100,756	133,850	32.8
Sparks*	40,780	53,367	30.9

* Not in the Carson River watershed, but shown here to illustrate the high growth rates typical of western Nevada communities in the last decade

1 Local governments in Carson City and the former Ormsby County merged to create one countywide entity called Carson City.

Figure 9
COUNTY BOUNDARIES



Where Have All the Forests Gone?

Modern travelers on the eastern side of the Sierras are accustomed to seeing mountains with a paucity of trees and a majority of brush, and they may attribute this condition to the rain shadow effect and the greater aridity on the east side. This concept is partly true, but historical practices have also contributed to the treelessness. Mountainsides in the Lake Tahoe basin and in the Carson basin anywhere within a reasonable haulage distance of Virginia City were denuded of trees in massive clear-cuts to supply two principal uses — the Comstock mines and the railroad. The mines consumed large quantities of timber for the square sets used to support the underground workings, for mine haulageways and mill buildings, and for fuel to run those mills that were not water powered. Railroads — the local tracks to the Comstock as well as the transcontinental railroad — used timber for ties and snowsheds. One estimate placed the amount of timber used in the transcontinental railroad's snowsheds across the Sierras at 65 million board feet. The photo on page 53 illustrates the amount of timber needed for a single trestle.

The initial development of the Comstock mines first decimated the relatively few trees in the Virginia Range and its environs. When these resources were exhausted, the logging moved westward toward Lake Tahoe. The forest that today occupies the eastern side of the Lake Tahoe basin is largely second-growth timber. Incline Village takes its name from the incline railway used to haul logs up the hill to the top of the Carson basin, where they were stored until the high streamflows of the spring snowmelt season, when massive log drives were held on the Carson River and its tributaries. Clear Creek, adjacent to today's Highway 50, was a frequent site of log drives. The timber was typically floated down the river to the vicinity of Empire or Dayton; from there it was hauled by wagon or rail to the Comstock. Logs were also transported from the headwaters area down to the Carson River in another of the Comstock's many inventions, the V-flume. Figure 10 is a perspective view of the area around Virginia City, showing how the Carson River and other geographic features could support the Comstock mines.

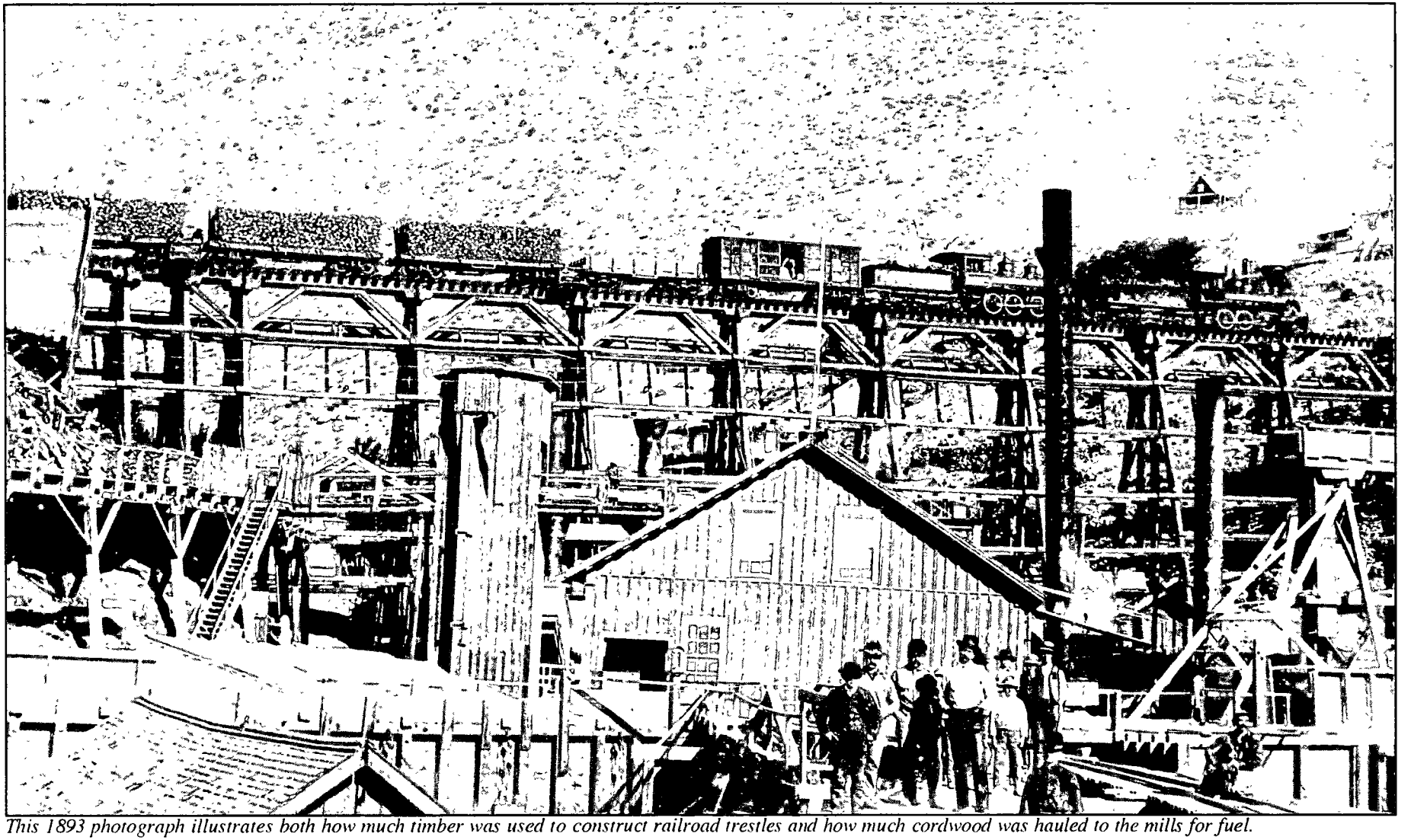
An account of the transport of logs in the flumes is given in Grant Smith's 1943 History of the Comstock Lode.

> *"These flumes, planed on the inside, half-filled with water, and on a fairly steep grade, carried a large quantity of lumber or firewood — as much as 500 cords of the latter in one day.... A large number of such flumes, some of them many miles in length, were in use along the Sierras for years.... The correspondent of the 'New York Tribune' told of a visit to the lumber mills ... and of a fearsome thirty-minute ride down the fifteen miles of flume in what was called a 'boat', which consisted of two twenty-inch boards nailed together in V-shape to fit into the flume, closed at the back and open in front, with strips of board 2 1/2 feet long nailed across the top for seats. Part of the time the flume was near the ground, but much of it was on the top of high trestlework in order to keep the flume at a fairly even grade. Water sprayed on them front and back. There was nothing to cling to but the seat and nothing but the blue sky above. '[Mr.] Flood said he would not make that trip again for all the silver and gold in the Consolidated Virginia.'"*

Dan DeQuille has provided us with the following description of a log drive on the Carson River:

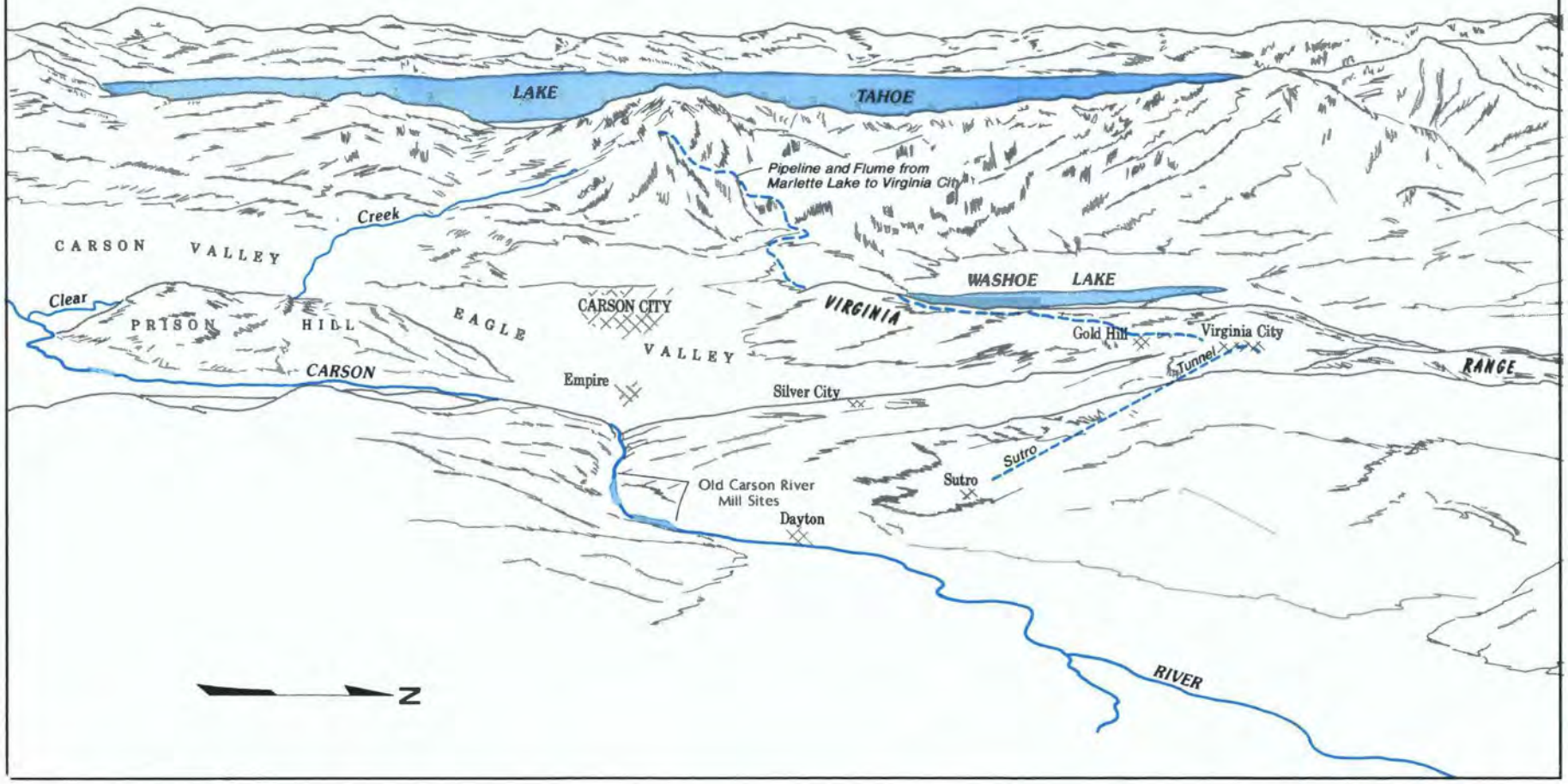
> *"Every season, from 80,000 to 100,000 cords of wood are floated down the Carson River. The wood is cut high up in the Sierras, at the head-waters of the Carson and its tributaries, and is sent down from the mountain slopes for many miles, in flumes of the same kind as those in use for the transportation of lumber.... The time for starting the drive is just after the great flood of the season — after the thaw that sweeps the greater part of the snow from the mountains. Then the wood comes down, huddled in the channel, and covering the whole surface of the water for fifty miles or more. At points where there are sloughs or bayous leading out of the river, booms are stretched to keep the wood in the straight and narrow way."*

Although the eastern side of the Lake Tahoe basin was heavily logged during these times, the trees were eventually able to regrow, aided by the high levels of precipitation the basin receives. Regrowth has been much less on the eastern side of the ridge and in the Virginia Range, where there were fewer and smaller trees to begin with, and where substantially lower precipitation levels and competition from livestock grazing in some areas has deterred reforestation.



This 1893 photograph illustrates both how much timber was used to construct railroad trestles and how much cordwood was hauled to the mills for fuel.

Figure 10
PERSPECTIVE VIEW OF VIRGINIA CITY AND SURROUNDINGS



Agriculture is a dominant land use in much of the basin, especially in the Carson and Lahontan valleys. Nevada has few major farming areas, due largely to the state's arid nature. The area served by the Newlands Project is one of the state's most important agricultural regions.[1] Most acreage in the project is devoted to alfalfa and irrigated pasture for livestock production (including dairies); lesser amounts of grains and truck crops are also produced. Fallon is noted for its annual cantaloupe festival, designed to promote the region's most acclaimed truck crop. Land ownership within the project is typified by a mix of large and small farms, some of which could be characterized almost as suburban ranchettes — properties chiefly used for supporting pleasure horses and livestock not intended for commercial sale. Agriculture in the Carson Valley is characterized by larger farms, where pasture and alfalfa again dominate.

Fallon alfalfa being hauled to market.

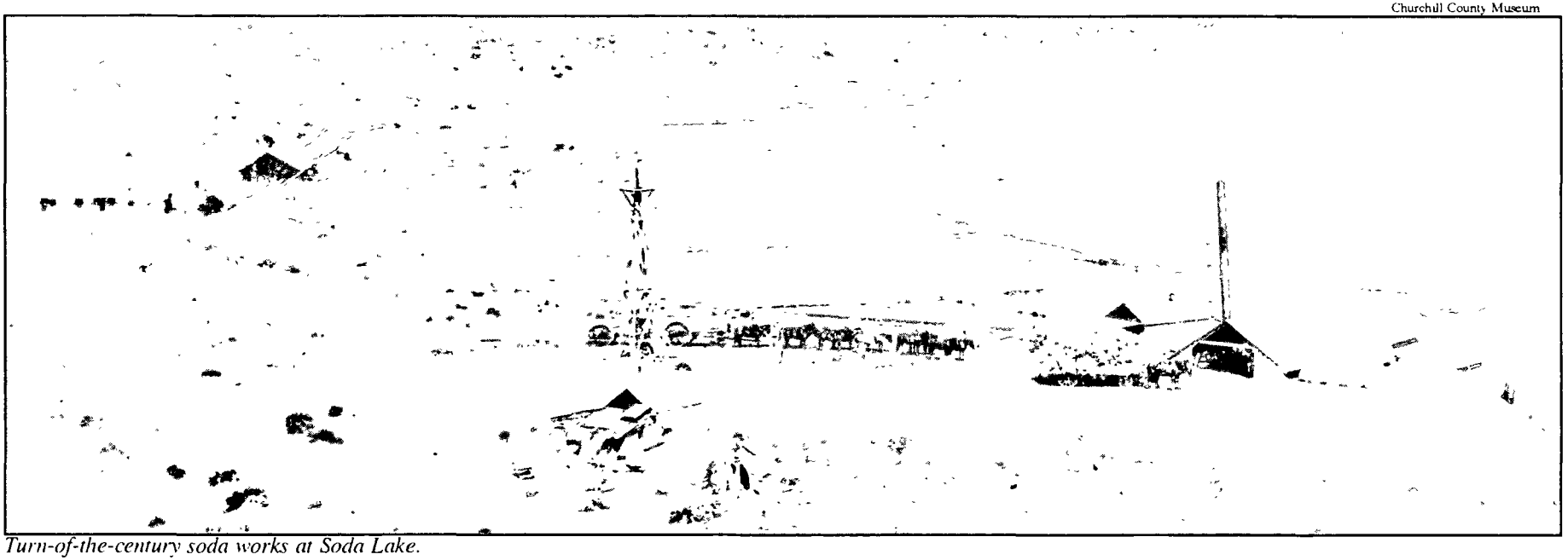
1 Farming of more limited extent was practiced in the Fallon area before the project's advent. Alfalfa is reported to have been first planted in the area in the 1870s.

An Unexpected Change in Land Use

The westward migration of miners and settlers to California and Nevada followed a predictable pattern — intensive mining activity, collapse of the mining boom, then widespread agricultural development. Ultimately, mining dwindled to a peripheral activity once the easily accessible ores had been high-graded, and agriculture became the driving economic force. The Carson Desert offers a slightly different example of agriculture displacing, or perhaps one could say swamping, mining.

Prior to development in the Carson Desert, two small lakes called Big and Little Soda Lakes (shown on Figure 4), occupied old volcanic craters in a topographic low point in the sink. The lakes were fed by ground water and by small springs, and they had no outlet other than evaporation. The lakes were highly saline — so much so that soda was mined there beginning in the 1860s. Mining continued until the soda works were flooded by rising lake levels caused by seepage from the Newlands Project. As the Nevada Division of Water Resources described in its Hydrologic Reconnaissance of Big and Little Soda Lakes: "Under native conditions prior to 1906, the lake stages were maintained at a fairly constant low level.... In 1906, when extensive irrigation began in the area, the lake levels began to rise, continuing until about 1930. The total rise in stage for the period was about 60 feet. The principal cause of the rise was attributed to seepage losses from the T, U, and N Canals...."

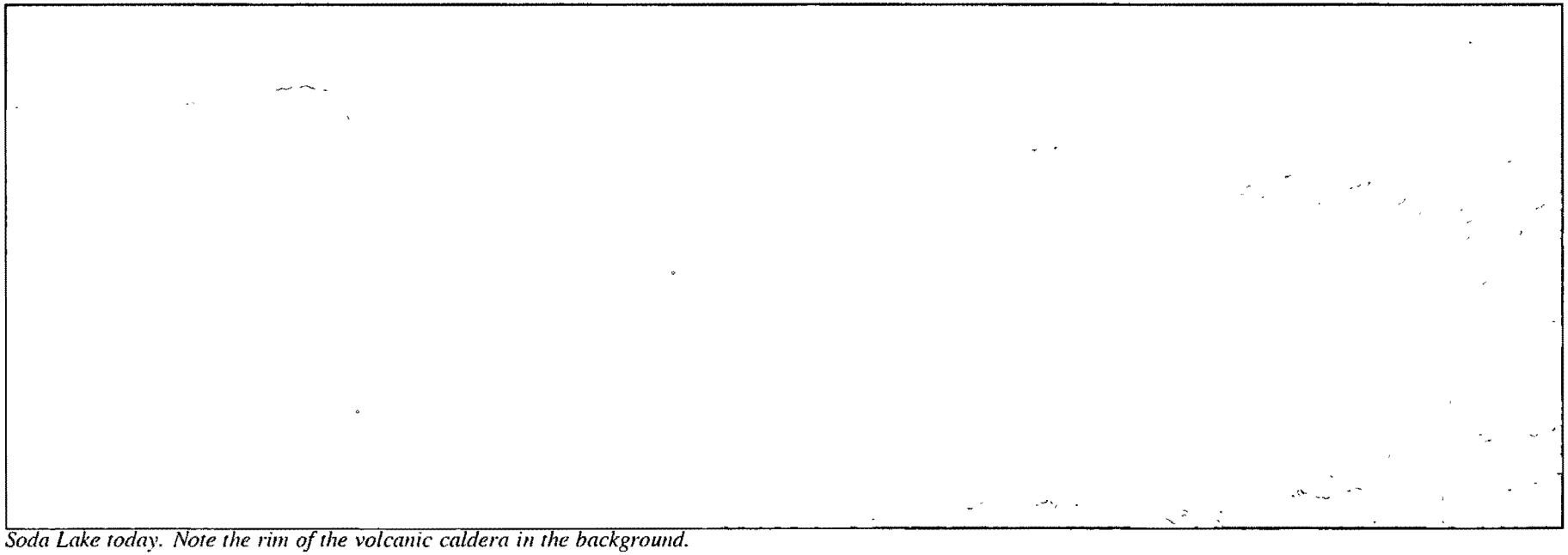
Churchill County Museum



Turn-of-the-century soda works at Soda Lake.

Land outside the developed areas could be described as high desert open space, especially in the Carson Sink in the eastern part of the basin. As with the California portion of the basin, there is a majority of federal land ownership; the largest clusters of privately owned lands are concentrated in Eagle, Carson, Dayton, and Churchill valleys and the Newlands Project service area. Much of the remaining private land in the eastern part of the basin is distributed in a "checkerboard" ownership pattern of alternating private and federal sections[1]. This pattern of ownership reflects early grants of land by the federal government as an incentive for construction of the transcontinental railroad. Most federal land in the Nevada portion of the watershed is administered by the Bureau of Land Management; other federal lands are administered by the Bureau of Reclamation, Fish and Wildlife Service, and the military.

The trade and service sectors are major components of the basin's economy in Nevada. Government employment is particularly important in Carson City and Fallon; tourism is an income source for communities within a short drive of Reno/Sparks or Lake Tahoe. Mining is an element in the economic climate of northern Nevada as a whole; the state of Nevada is a leader in the nation's gold mining industry.



Soda Lake today. Note the rim of the volcanic caldera in the background.

1 A section of land is a standard United States mapping unit, normally a square with sides one mile long.

Chapter 5

THE WATER WARS

This chapter takes its name from the term many writers have applied over the years to the long-standing disputes over water and water rights on the Carson and Truckee rivers. The Newlands Project has figured prominently in most of these disputes, reflecting its status as the largest water user on both rivers. Some of the more colorful actions that occurred before the turn of the century are briefly discussed, then the history of the more recent litigation and negotiations is covered. The story of disputes over these waters clearly illustrates the thoughts behind Mark Twain's aphorism that:

> *"...whiskey is for drinking and water is for fighting over."*

The importance of water rights to the local inhabitants can be perceived from the tone of the following quotation, taken from the dedication to *Conflict on the Carson, A Study of Water Litigation in Western Nevada*. This book was written by Grace Dangberg, a member of one of the Carson Valley's pioneer farming families, a family that was one of the parties in the seemingly interminable Alpine Decree case.

"Dedicated to all those citizens of western Nevada, lay and professional, named and un-named, who have stood firm in defense of their water rights under Nevada's water laws."

John Kramer

This monument to the water wars is in Tahoe City, by the Lake Tahoe Dam.

A Summary of Some Water Rights Concepts

A variety of water rights concepts are mentioned in this chapter. The following information highlights a few basic concepts, particularly those that apply to the Carson River. Readers interested in more detail on this subject are referred to publications listed in the annotated bibliography, Appendix 3.

Water rights in California and Nevada are administered by the state. Agencies performing this function are the State Water Resources Control Board in California and the State Engineer in Nevada — and in some cases the courts. California law recognizes that surface water rights may be held under a variety of doctrines — riparian or appropriative, for example. There is no statewide system for administration of ground water rights, except for ground water that is actually stream underflow or that flows in known and definite underground channels. Use of most ground water in California is unregulated, except in special circumstances where individual basins have undergone special adjudications or where a local ground water management district has been created. In contrast, Nevada has a statewide system for administration of both ground water and surface water rights. Like many other western states, Nevada's water law is based on the appropriative doctrine for both ground water and surface water.

The doctrine of riparian rights is an old one, having its origins in English common law. Persons who own land adjacent to a stream have the right to make reasonable use of the stream's natural flow on those lands within the watershed. (The emphasis on natural flow means that riparian rights cannot be claimed for long-term storage of water in a reservoir, as for example in the federal project reservoirs). Riparian users of a stream share the streamflow among themselves, and the concept of priority of use is not applicable. Under drought conditions, the users share shortages. Riparian rights cannot be sold or transferred for use on nonriparian land. No permit is required for riparian use in California, although such users are required to file "Statements of Water Diversion and Use" with the State Water Resources Control Board. (Riparian rights to the waters of a lake — as opposed to a flowing stream — are often called littoral rights.)

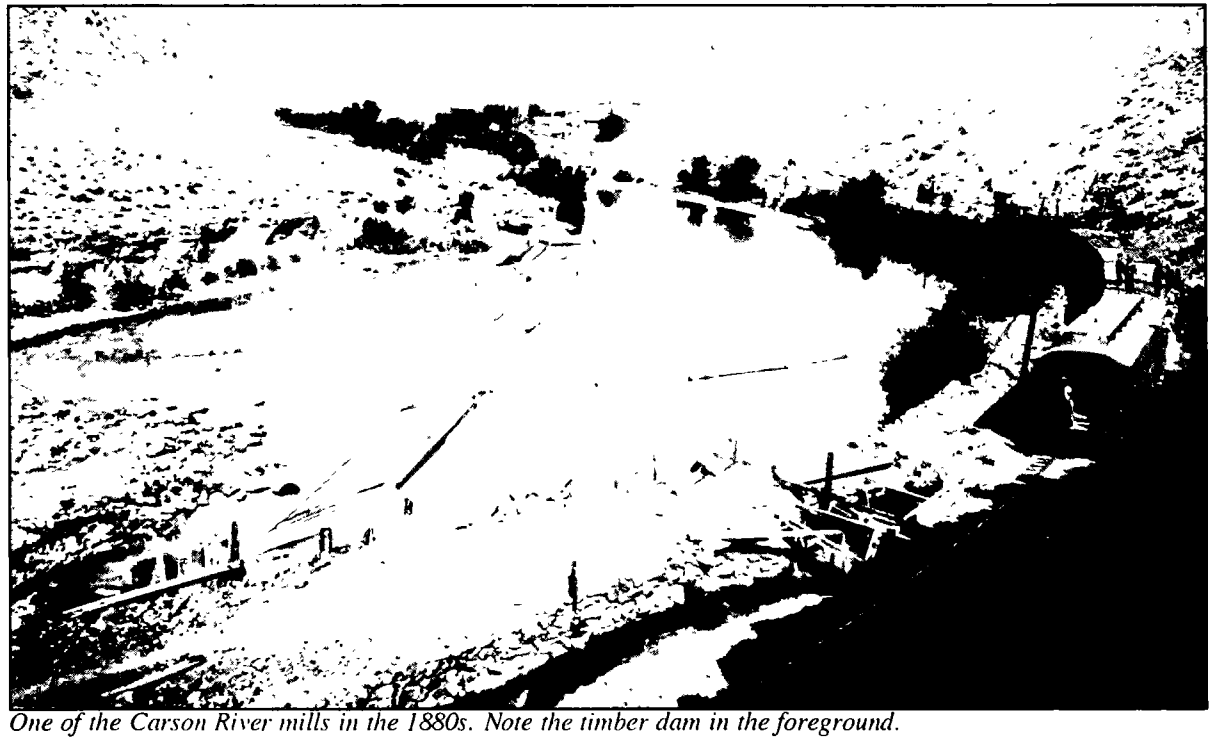
The doctrine of appropriative rights was in common use throughout the arid west as early settlers and miners began to develop the land. The appropriative doctrine is based on the concept of first in time, first in right. The first person to take a quantity of water and put it to beneficial use has a higher priority of right than a subsequent appropriative user. Under drought conditions, higher priority uses are satisfied before junior users receive water. Appropriative rights can be lost through nonuse; they can also be sold or transferred apart from the land. Nevada, for example, has had a thriving market for water transfers for a number of years, due to the relative scarcity of water there and, hence, the economic competition for it. A person who claims an appropriative right must file an application with the appropriate state agency. (The permit process in California has changed over time, and appropriative rights are subdivided into pre- or post-1914 rights, because of the difference in their administration.)

Federal water rights occupy a special place in the pantheon of rights. An important 1978 U.S. Supreme Court case (California v. United States) held that the federal government must obtain water rights under state law for reclamation projects, unless state law conflicted with clear congressional directives. As a practical matter, the U.S. Bureau of Reclamation has normally participated in the state permitting process since the inception of the Reclamation Act, and the federal reclamation projects described in this atlas hold permits from California, Nevada, or both.

Federal reserved rights are a category of federal rights, created by federal law. These rights are created when the government withdraws land from the public domain to establish a federal reservation such as a national park or Indian reservation. By this action, the government is held to have reserved water rights sufficient for the primary purpose for which the land was withdrawn.

The Early Skirmishes

Some of the first disputes over the waters of the Carson River arose from the milling activities associated with the Comstock mines. The extremely rapid expansion of the mines in the early 1860s led to a correspondingly intense ardor for building mills to process the rich ores. It was estimated that the area had more than 70 mills by the end of 1861. The potential availability of water power to turn the stamps, together with the scarcity of flat terrain in the Virginia Range itself, soon encouraged mill construction along the Carson River. The reach of the river canyon between Empire (today on the outskirts of Carson City) and Dayton contained a number of large mills; the river's fall in this reach was on the order of 30 feet — not large, but sufficient to power the stamp and pan mills.



One of the Carson River mills in the 1880s. Note the timber dam in the foreground.

Typically each mill would construct a timber diversion dam in the channel to direct water into its flume system. Most of the mills used large wooden pelton wheels (the forerunners of a type of turbine still used today) to power their stamps, and some used them to generate electric power as well. (A few mills were steam powered.) These mills were, in fact, the earliest users of electric power in the Carson's watershed.

The mill owners soon learned of the limited extent of the Carson River's resources, particularly in the summer. Then the normally scant natural flow of the river was further diminished by upstream irrigation diversions, which forced the mills to shut down their stamps due to lack of water.

The economic impacts of this situation soon led to court disputes, beginning in the 1860s and extending through the 1880s, and pitting the mill owners against the agricultural water users, primarily in the Carson Valley. These cases are sometimes collectively referred to as the Union Mill cases, after the Union Mill and Mining Company, a litigant in several of the most important suits[1] and owner of a group of mills. On several occasions during the drier years, the mill owners brought suit against the upstream agricultural users, seeking to compel them to limit diversions. The mill owners also employed ditch riders to monitor the farmers' diversions and to shut down the ditches deemed to be diverting

1 Citations for several of these cases are provided in Appendix 3.

adverse to the mills' rights. The irrigators naturally took exception to these actions, as attested to in the court cases.

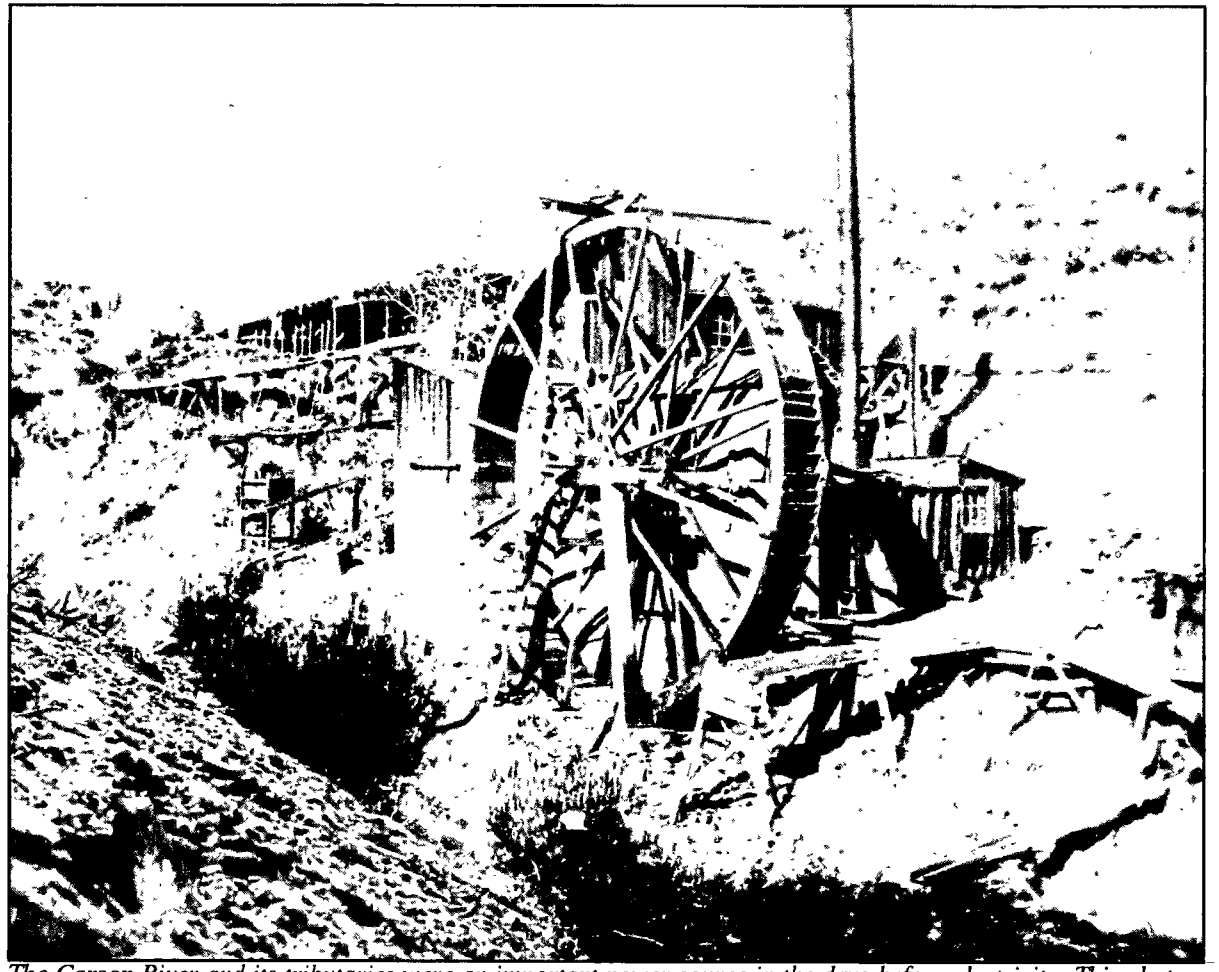
The Union Mill federal court cases yielded some results pertinent to later litigation on the Carson River. They provided a forum for consideration of the competing doctrines of riparianism and appropriation, with the federal court explicitly recognizing riparian rights in some instances. This reliance on past riparian rights is echoed in the later Anderson-Bassman Decree, discussed below. (The Nevada State Supreme Court repudiated the doctrine of riparianism in an 1885 decision, asserting that henceforth the state's water rights administration process should be based on appropriation because it better suited the region's arid conditions.) The Union Mill cases also collectively provided a precedent for the later regulation of the river, which was to be imposed during the summer months.

The mills themselves held but short sway over water rights actions on the river, as they did not long survive the collapse of the Comstock boom. Their timber dams on the river were not designed for permanence and were easily swept away by floodwaters. Many of the wooden mill buildings were washed away in a 1907 flood, which also destroyed the dams and flume systems; the remaining buildings fell prey to the twin perils of fire and vandalism. Today, almost nothing remains of the once-extensive mill development, save some traces of the railroad lines that once traversed the area. The photograph on this page shows the ruins of a later concrete mill structure in the canyon, one of the few easily visible remnants of the area's mining past.

Ruins of a mill at Brunswick Canyon, adjacent to the Carson River. This more recent concrete mill has survived the perils of fire and vandalism, which obliterated the earlier, wooden mills in the Carson River canyon.

The Ferris Wheel

Large wooden pelton wheels such as the one shown at right were a common sight at the Comstock mills. A pelton wheel, resembling an old-fashioned water wheel, is actually a type of impulse turbine in which a falling stream of water strikes buckets mounted around the circumference of the turbine wheel. The rotation of the wheel (called a runner) could be used to generate electrical power or to turn a shaft powering the stamps of a mill. One observer of the mills on the Carson River saw more than the wheels' hydropower production potential. George Washington Ferris Jr., the eponymous engineer who invented the Ferris wheel, did so based on his observation of the Carson River's pelton wheels. Ferris' invention made its public debut at the World's Columbian Exposition in Chicago in 1893. The Ferris family was itself involved in the Carson River water disputes, being among the defendants in a suit leading to one of the Union Mill and Mining Company decrees.



The Carson River and its tributaries were an important power source in the days before electricity. This photo of a water-powered sawmill at Gold Hill was taken around 1880.

The Campaign for Reclamation

The concept of manifest destiny played an important role in shaping social values in the latter part of the 19th century. The inevitability of westward expansion and settlement was the national destiny made manifest, and public policy was fashioned to encourage settlement of the west. Laws were enacted — the Homestead Act of 1862 and the Desert Lands Act of 1877, for instance — to transfer land acquired by the federal government to individual settlers.

The initial opening of federal territories under the Homestead Act created the first of many land rushes, as new immigrants and existing citizens alike were lured by the promise they could acquire federal land for almost nothing if they were successful in improving it. Reflecting the nation's agrarian legacy, these acts and accompanying public policy were intended to foster the spread of small farms (160 acres under the terms of the Homestead Act) in the sparsely inhabited newer states and territories.

Churchill County Museum

Early settlers on the Newlands Project.

There was one minor impediment to the development of extensive tracts of agricultural land in the western United States — lack of water. Development of large-scale irrigation projects was a new concept at this time, since farms in the eastern part of the country typically relied on spring and summer rains for their water supply. The dry summers of the west, as well as the lesser amounts of rainfall, meant crops would require irrigation during the growing season. The earliest inhabitants in the more arid regions could settle along the banks of watercourses and thus be assured of a water supply, but the large areas of land not convenient to a surface water source could not support subsistence farming.[1]

1 Well drilling technology was primitive at this time; hand dug wells might suffice to supply a household's needs, but use of ground water, where available, as a significant irrigation supply was not yet to be.

It was argued that most individual settlers would lack the resources and knowledge to construct the major works required to fully open the arid west to settlement, hence the need for a national irrigation policy. The failure of a number of privately owned irrigation companies in the 1880s and 1890s was pointed to as further justification of the need for a substantial national program.

Francis G. Newlands (see sidebar, page 27) was an early advocate of irrigation projects in Nevada, first as a private investor and later as a member of Congress. His dealings with Carson River water users to promote reclamation are described (from the viewpoint of the Carson Valley agricultural interests) in *Conflict on the Carson*, referenced in Appendix 3.

Not all local water interests wanted a federal project on the Carson River. Existing water users tended to be wary of adding more water rights claimants on a river where shortages were already occurring during irrigation season.[1]

The general concept of a federal reclamation program had its supporters and its opponents in the political arena and provided local newspapers with abundant editorial material for the journalistic advocacy common to the times. The verses below, excerpted from *Conflict on the Carson*, were published by two local newspapers in 1902 in support of a federal program.

GIVE US WATER UNCLE SAM

We've just learned that you've decided
After many years delay,
To supply the West with Water,
If you find the scheme will pay.

We've been praying hard for moisture
Through the hot and arid years,
But our cry of 'Water, Water!'
Has just lately reached your ears.

Though we're longing for this liquid,
Yet we wouldn't have you think,
For a solitary minute,
That we want the stuff to drink.

We have other kinds of liquids,
From the best brands to the worst,
And they're all quite efficacious
When it comes to quenching thirst.

We maintain out here that Water
It's great function best fulfills
When it irrigates our ranches
And brings power to our mills.

Excerpted from *Conflict on the Carson*

Ultimately, Senator Newlands, as a Nevada congressman, was able to draw on his friendship with President Theodore Roosevelt to win support for the reclamation bill the senator had been championing for some time. This legislation ushered in a new era of federal water policy and brought to Nevada the distinction of having the nation's first project under the new act.

1 Some land in what would eventually be the Newlands Project service area was being farmed prior to the project's inception. The associated water rights were ultimately acquired by the U.S. Bureau of Reclamation and melded into the project.

Making the Desert Bloom

The U.S. Bureau of Reclamation has been the major developer of water projects on the Truckee and Carson rivers. As owner of the Newlands Project — the river's largest water user — the Bureau of Reclamation has been involved in almost every water right litigation or legislation described in this chapter.

The Bureau of Reclamation, earlier known as the Reclamation Service, was created by the Reclamation Act of 1902 as an entity within the U.S. Geological Survey. Its mission was to carry out the public policy of making the desert bloom or, in other words, encouraging settlement of the arid west (then comprising 13 states and 3 territories) by providing irrigation projects so the land could support settlers. The following quotations from the First Annual Report of the Reclamation Service, published in 1903, provide a flavor of the times.

> *"To remedy this evil [meaning the earlier lack of planning for water supply and water rights when subdividing public lands for homesteading], so that the remaining public lands will furnish the greatest possible number of homes, is an object worthy of the sustained effort of enlightened and patriotic citizens.... The development of water for irrigation is a matter of concern to all citizens of the United States, since they are the great landowners, and, as such, are, or should be, interested to see that their lands are put to the best uses. It is their duty also to guard these vast tracts, the heritage of their children.... Unquestionably it is a duty of the highest citizenship to provide a hundred homes for independent farmers, instead of permitting the land to be occupied as one or two great stock ranches, controlled by nonresidents, and furnishing employment to only a few nomadic herders.*
>
> *"The pioneer settlers on the arid public domain chose their homes along streams from which they could themselves divert the water to reclaim their holdings. Such opportunities are practically gone. There remain, however, vast areas of public land which can be made available for homestead settlement, but only by reservoirs and mainline canals impracticable for private enterprise. These irrigation works should be built by the National Government. The lands reclaimed by them should be reserved by the Government for actual settlers.... The distribution of the water, the division of the streams among irrigators, should be left to the settlers themselves, in conformity with State laws and without interference with those laws or with vested rights."*

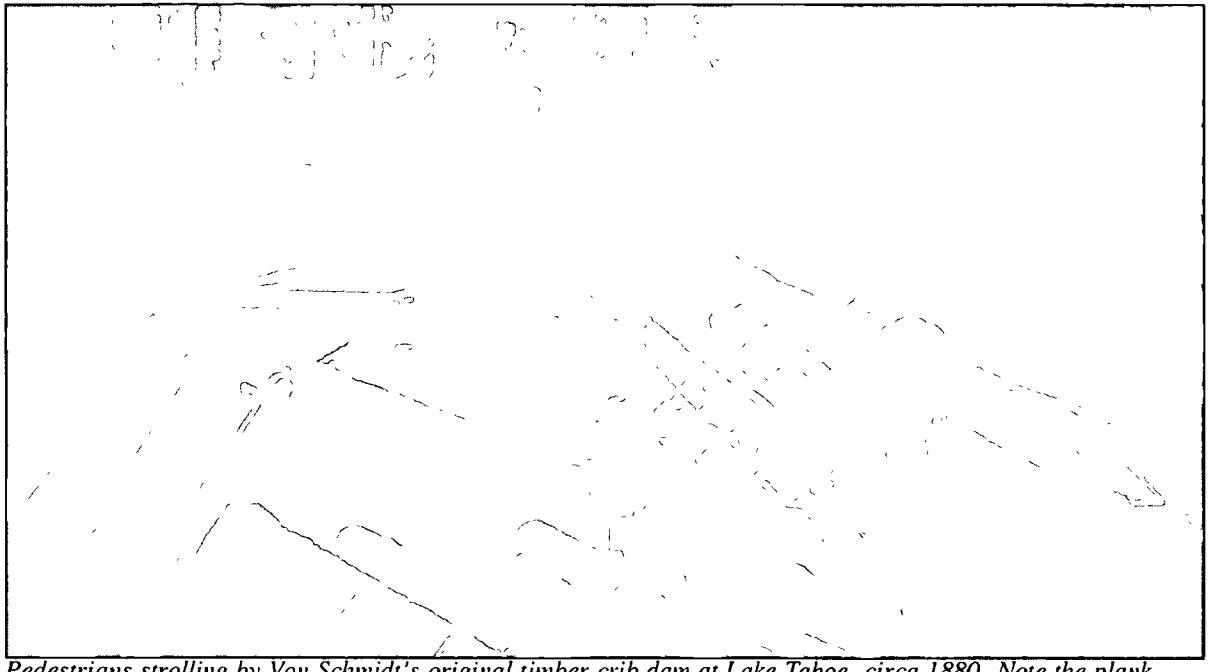
The annual report goes on to describe some of the projects the Reclamation Service was considering in the western states:

> *"The situation in Nevada is further complicated by the fact that much of its water supply comes from across the State line on the west.... Thus to utilize the spring floods it will be necessary to construct reservoirs in California and take the waters out upon lands in Nevada."*

Potential reservoir and irrigation projects were described, including Lake Tahoe Dam and several reservoir sites on the Carson River: Silver King, Soda Spring, Prairie, and Diamond Valley in California; and Mud Lake, Alkali Flat, and Lower Carson in Nevada. Of these sites, reservoirs have actually been constructed at Mud Lake and at Lower Carson (Lahontan Reservoir is a modification of the Lower Carson site). The Silver King site continues to be of interest as a potential damsite and has been studied a number of times for various projects, one of the most recent being a proposed hydropower development.

The Newlands Project and Lake Tahoe Dam

With the passage of the Reclamation Act of 1902, the Bureau of Reclamation began rapid construction of project facilities and began supplying water to the Nevada farmers. Derby Diversion Dam, on the Truckee River, was the first structure in the Nation to be built under the Reclamation Act. In 1903 the Bureau of Reclamation made an initial claim for rights to water stored in Lake Tahoe for the Newlands Project, which marked the beginning of years of litigation over the project's rights.



Pedestrians strolling by Von Schmidt's original timber crib dam at Lake Tahoe, circa 1880. Note the plank facing showing at the lower left corner.

Although diversion of water into the Truckee Canal began as soon as the canal and local irrigation distribution system ditches were completed, the Bureau of Reclamation lacked control of the existing dam at Lake Tahoe and, hence, could not guarantee reliability of the irrigators' water supply. The Bureau of Reclamation's efforts to garner more water for the Newlands Project precipitated lengthy disputes over rights to Truckee River water. These are covered below to the extent that they affect the water supply available to the Carson River basin below Lahontan Reservoir. More detail on the Truckee River water disputes is provided in the Department's *Truckee River Atlas* (June 1991).

The original dam at Lake Tahoe was a small timber crib structure used to control the river's flow for transporting logs downstream, variously reported to have been constructed in 1871 or 1874. The power company had subsequently acquired the dam; now the Bureau of Reclamation and the power company entered into negotiations, which spanned about a decade, over control and operation of the dam[1] During this same period, other methods for providing addi-

1 The decade from 1900 to 1910 saw the consolidation of many small public and private water and power companies in the Truckee River service area. In a complicated series of real estate transactions, one such interest obtained title to the dam along with some hydropower plants on the Truckee River in 1902. In 1908, an eastern power syndicate acquired the assets of the Truckee River General Electric Company and continued the negotiations with the Bureau of Reclamation that eventually led to the Truckee River General Electric Decree. Throughout this chapter, the term "power company" is used to refer to Sierra Pacific Power Company or any of its predecessors among the small power companies who held water rights that were later absorbed by Sierra Pacific. Sierra Pacific today provides water and power service in the Reno/Sparks metropolitan area.

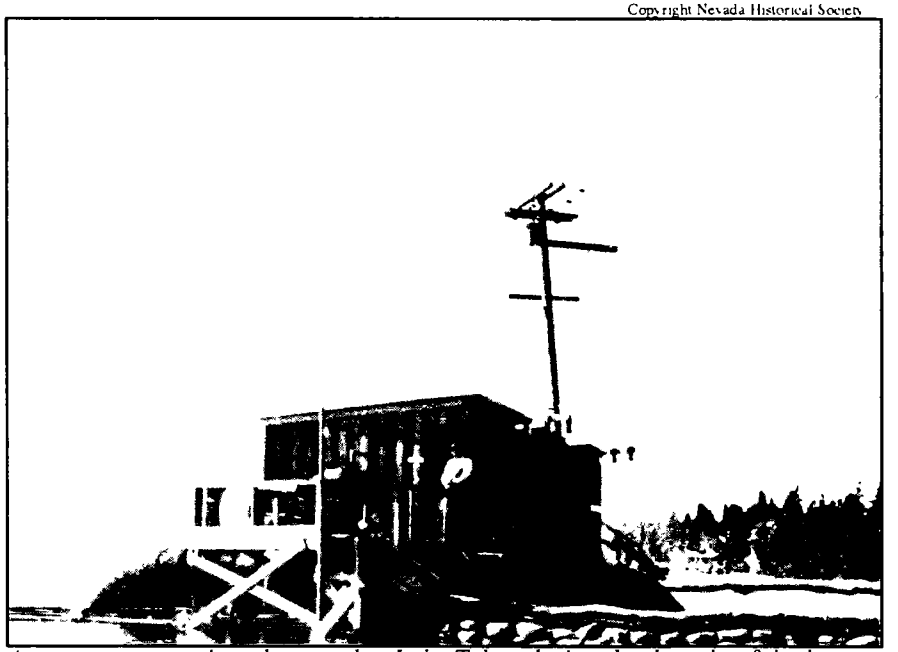
tional water for the Newlands Project were being considered, including construction of a tunnel and conveyance facilities from the eastern side of Lake Tahoe to Washoe Lake in Nevada, where the water would be available to sell to Newlands Project users. This proposal, supported by the power company and the Bureau of Reclamation, was eventually overcome by the opposition of Tahoe lakeshore property owners and the State of California.

During the period from 1909 to 1913, the old timber crib dam at Lake Tahoe was being reconstructed by the Bureau of Reclamation and the power company, creating today's concrete slab and buttress structure. Negotiations and litigation between the power company and the Bureau of Reclamation were finally resolved in a 1915 federal court consent decree known informally as the Truckee River General Electric Decree. This decree granted the Bureau of Reclamation an easement to operate Lake Tahoe Dam for the Newlands Project and to use surrounding property owned by the power company. An excerpt from the decree is shown in the sidebar below.

The Truckee River General Electric Decree

The section of the decree dealing with the easement granted to the U.S. Bureau of Reclamation by the Sierra Pacific Power Company for control of Lake Tahoe's dam and outlet works is quoted below. The term plaintiff in the quotation refers to the U.S. Bureau of Reclamation; Truckee River General Electric Company is the defendant.

> *"That plaintiff is entitled to condemn and acquire in this proceeding, and by virtue of this decree, upon making the payment therefore herein specified, an easement and right of exclusive possession and enjoyment, in, over and upon said lands hereinafter described, to hold, maintain, use and operate said lands, dam and controlling works, and any other improvements and structures which now are or may be hereafter placed upon said lands, for the purpose of controlling the level of Lake Tahoe and the storage of water therein, and all rights now held by defendant The Truckee River General Electric Company to use said lands, dam and controlling works, for said purposes; and that the plaintiff's said easement and right of possession, use and enjoyment shall be exclusive and perpetual, subject only to termination in the event of abandonment and disuse thereof by plaintiff as hereinafter provided."*



A temporary pumping plant used at Lake Tahoe during the drought of the late 1920s and early 1930s. The pumps are housed in the wooden sheds. The intake and discharge pipelines can be seen on opposite sides of the sheds.

First Clashes Among the Agricultural Users

As already noted, the earliest conflicts over Carson River waters arose between Comstock mining and milling interests and agricultural water users in the Carson Valley. The beginning of the 20th century marked the start of conflicts among the agricultural users themselves — first internally among upper Carson water users in California and Nevada, and subsequently among the upper river users and Newlands Project users on the lower river. Rights to Truckee River water diverted to the project also became an issue to users of Truckee River water.

The Anderson-Bassman Decree, issued in 1905, is the first of this century's significant water rights decrees on the Carson River. This action was brought in federal court to adjudicate rights of the parties in the lawsuit to the West Fork Carson River in both states. It covered irrigated lands in Alpine County in California and Douglas County in Nevada (primarily Diamond Valley and upper watershed valleys in California, and Carson Valley in Nevada). The decree established the acreage that could be irrigated pursuant to these rights, established a rotation of the river between California and Nevada users, and made special recognition of riparian rights. The rotation of irrigation diversions was to occur during summer and fall, when the natural flow of the river was small and not sufficient to serve the needs of all the users. In this case, upstream California users and downstream Nevada users were required to make their irrigation diversions in alternate weeks during June through October. Such rotation of diversions has historically been practiced on other western rivers; one benefit provided by limiting diversions on such a basis is that irrigators can obtain a greater head of water[1] at their ditches or canals than they would if all users were continuously diverting. The following quotation from the decree illustrates the problem with diversions that contributed to the filing of the litigation.

"That on or about the 14th day of December, 1899, and for a long time prior thereto, and since said date, the defendants named in the above-entitled action, and each of them, by means of dams and ditches, erected and constructed on and from said West Fork of the Carson river, and above the dams and ditches of complainants, have diverted from the channel of said river large quantities of water therefrom, and at times during said period diverted all of the waters of said stream away and from said complainants and each of them, and that said defendants and each of them threaten to maintain and continue the same, to the great and irreparable injury of said complainants and each of them."

The next action on the West Carson occurred not long after, with the issuance of the Price Decree in 1921. This California court decree was a detailed determination of the rights of the California users on the West Fork. The earlier Anderson-Bassman Decree did not specify the amounts of water that could be diverted; it specified only the acreages to which rights applied. The Price Decree was, in essence, an adjudication of the California rights that had been recognized in the earlier Anderson-Bassman Decree. Neither of these decrees, however, dealt with water rights claims for that juggernaut of the Carson River, the Newlands Project.

A new round of water rights disputes began when the Bureau of Reclamation sought to establish water rights for the Newlands Project by bringing suit against existing water users on the Truckee and Carson rivers. The federal government initiated the litigation that would eventually result in the Orr Ditch Decree on the Truckee River in 1913, and in 1925 initiated similar litigation on the Carson River that eventually resulted in the Alpine

1 If more water is in the river, more water pressure is available at a user's ditch or canal, making it easier to convey water to the land to be irrigated, and to move the water through the farmer's distribution system.

Decree. The Alpine Decree was finally issued by the federal district court in 1980, making this case one of the longest-running water adjudications in the federal court system.

The Newlands Project and the Drought Years

Conflicts over Newlands Project water rights took on a new urgency in the 1920s. The Bureau of Reclamation had designed the project in a time of wetter-than-average hydrology, tacitly assuming that stored water in Lake Tahoe together with the terminal flow of the Carson River would be sufficient to serve the needs of the project, which the Bureau of Reclamation now had contractual obligations to meet. The drier years at the beginning of this decade, coupled with political pressures to keep expanding the irrigated acres served by the project, belied this assumption. The years 1928 through 1934 were the driest years of record in many Northern California and Nevada river basins. In addition, the level of Lake Tahoe fell below the lake's natural rim in water years beginning in 1924, 1929, 1930, 1931, 1932, 1933, 1934, and 1935. When the lake falls below its natural rim, water can be retrieved from the lake only by pumping, which was a controversial subject even at that early time. The water supplies available to Newlands Project water users, as well as to agricultural water users in the Truckee River watershed, were greatly curtailed in these drought years.

Newlands Project interests rapidly became embroiled in the Lake Tahoe pumping alterations that were prompted by the drought. One of the most colorful incidents occurred in 1930, when a group of Nevada interests sent a steam shovel with a Reno police force guard to the power company's property adjacent to the dam to start digging a diversion trench to the lake's rim; it was also feared that they would try to dynamite the dam itself. Sheriff's representatives on the California side of the stateline formed a posse and sought to stop the digging. Ultimately, the lakeshore landowners and other Tahoe preservation interests obtained a court injunction against the power company, Truckee-Carson Irrigation District, and others to halt the digging, and the trench was subsequently backfilled.

The trenching caused major consternation among California officials and sparked a

The infamous trench at Lake Tahoe, before (left) and after backfilling.

flurry of correspondence and site inspections by the California State Engineer's office (a predecessor of the Department of Water Resources). The photos on page 70, taken during these inspections, show the infamous trench before and after backfilling. This skirmish served to illustrate the frustration of farmers, both in the Newlands Project and in the Reno area, over not receiving the water they felt was their due.

Rural areas suffered other drought impacts as well. When there was no more water to release from Lahontan Dam for the irrigators, the turbines at the hydropower plant ceased to turn, and the town of Fallon was without power. In these early days of rural electrification, the concept of an interconnected power grid was an unknown luxury, and Fallon was served only by the hydropower production of Truckee-Carson Irrigation District.

Pumping Lake Tahoe was a subject of considerable public, as well as water user, interest. Newspapers of the time devoted much attention to this topic, as indicated by the articles excerpted in the sidebar at right. In some instances the irrigators were able to sway public opinion and to coerce the Tahoe lakeshore property owners into acquiescing to pumping by emphasizing the economic impacts of the drought and by threatening crop damage suits. The lake was pumped several times during the drought, as shown in the following table.[1]

Year	Amount Pumped (acre-feet)
1924	34,000
1929	33,960
1930	25,080
1934	24,610

The Pumping Controversy

Pumping Lake Tahoe was clearly a controversial issue during the 1930s. Shown below are two accounts of the subject published in newspapers at the time.

The Sacramento Bee, May 30, 1934

"Owners of homes, resorts and property surrounding this most beautiful of mountain lakes are stirred to the depths by the threat that the drought in Nevada and the greed of the power company operating on the Truckee River together may cause the withdrawal of water in sufficient quantities to lower the lake's level and damage its natural beauties. The fight to preserve the lake has gone on for more than twenty-five years. This year, however, it promises to be more bitter than ever...."

The Oakland Tribune, June 12, 1934

"Difficulties preventing immediate pumping of Lake Tahoe waters onto drought-stricken Nevada farms were discussed today after water-front property owners refused the plea of Acting Governor Moreley Griswold of Nevada for immediate relief. Griswold described the drought as the most critical in Nevada's history when he addressed property owners at Bijou on Lake Tahoe yesterday afternoon and asked that the landowners sanction pumping of lake water onto the arid lands.... As the acting Governor was telling how cattle and sheep were dying at dried up Nevada water holes, his speech was interrupted for ten minutes by a sudden hailstorm...."

1 Various figures have been reported for the amount of water pumped from the lake. These amounts are taken from the 1952 *Preliminary Report of the Lake Tahoe Interstate Water Conference Committee.*

The Truckee River Agreement

The thicket of suits, threats of suits, and public controversy engendered by the drought did at least serve to keep the parties with claims on Lake Tahoe at the negotiating table. Negotiations among assorted interest groups had been going on for a number of years but had been hampered by uncertainties surrounding water rights, including complications caused by the two states' different water rights doctrines.[1] Negotiations over topics such as Tahoe lake levels, pumping, and selected water rights issues finally coalesced in 1935 in the form of the Truckee River Agreement. Today, more than 55 years later, this agreement remains the basis for operation of the Truckee River.

The Newlands Project, as the Truckee River's largest water user, was represented in the agreement by the Bureau of Reclamation and Truckee-Carson Irrigation District. Other parties to the agreement included the power company and agricultural water users in the Truckee basin. The states of California and Nevada were not parties to the agreement, nor were any California water users. The Truckee River Agreement became an important element in a 1944 federal court decree, informally known as the Orr Ditch Decree. This court decision had its genesis in a suit filed back in 1913 by the Bureau of Reclamation, when it sought to confirm water rights held for the Newlands Project. Like most litigation over the Truckee and Carson rivers, the Orr Ditch case lasted for years. The decree is an adjudication of water rights (in this case, appropriative rights) of the parties to the suit, and it incorporates the Truckee River Agreement by reference. Parties to the decree include the signers of the agreement plus many individual water rights holders. Thus the decree establishes individual water rights — amounts, place and type of use, and priorities — and the agreement provides a framework for operating the river to meet those rights.[2]

Together, the decree and agreement govern the amount and timing of flows diverted down the Truckee Canal into Lahontan Reservoir. The decree sets forth the amount of the project's rights to water diverted from the Truckee River and fixes the earliest priority at 1902, which is relatively junior by Truckee River standards. The agreement provides for operation of storage facilities, especially Lake Tahoe, to satisfy these rights and specifies criteria for diversion of flow into the Truckee Canal. The agreement further contains language intended to settle the disputes over pumping Lake Tahoe, allowing the lake to be pumped for agricultural use under the conditions quoted below.

> *"From and after the OPERATIVE DATE OF THIS AGREEMENT, all of the parties hereto agree as follows: (1) That the natural conditions obtaining on said date in the bed and banks of Lake Tahoe and of the Truckee River at and in the vicinity of the outlet of Lake Tahoe, above the dam that is at or near the point where said Lake empties into the Truckee River near Tahoe City, Placer County, California, shall not be disturbed or altered by any of the parties hereto without the approval of the Attorney General of the State of California; provided, however, that in the event that said conditions*

1 The Bureau of Reclamation had recognized some time earlier that additional upstream storage, in addition to that provided at Tahoe, would be necessary to supply the downstream Nevada irrigators and had undertaken some investigations of potential projects in the upper Truckee and Carson watersheds. Its investigations had not translated into projects because of some of these same water rights uncertainties.

2 The decree does not make an interstate allocation of waters of the Truckee River between the two states; it only quantifies individual water rights. Neither state is a party to the decree.

existing on said date shall alter or change for any cause or reason, then the parties hereto respectively shall have the right to restore said conditions; (2) that they will not create nor cause to be created any outlet of said Lake in addition to the present natural outlet thereof; and (3) that they will not remove water from Lake Tahoe for irrigation or power uses by any means other than gravity, except upon the condition that the Secretary of the Interior of the United States shall have first declared the same a necessity, and that they will not remove water for sanitary or domestic uses by any means other than gravity, except upon condition that the Departments of Health of the States of Nevada and California, or other officers exercising similar authority, shall first have made and filed with the Attorney General of the State of Nevada and the Attorney General of the State of California certificates showing that a necessity for the same exists."

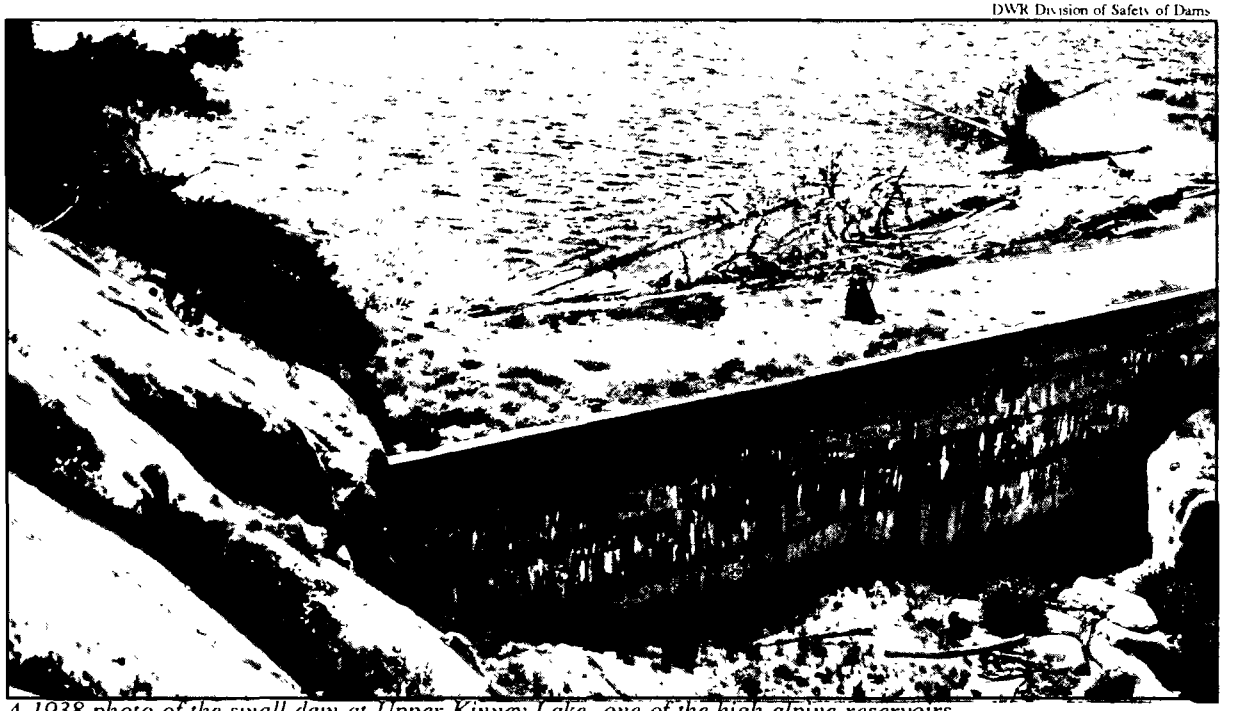
The present-day dam at Lake Tahoe under low water conditions. This view shows the upstream side of the dam.

The Alpine Decree Litigation

As noted earlier, the federal government had filed suit against Carson River water users to establish the Newlands Project's rights on that river, just as it had done with the Orr Ditch litigation on the Truckee River. The two suits at first proceeded along similar timelines, although progress on the Alpine litigation eventually slowed, until a total of 55 years would elapse between the filing of the suit and the issuance of the decree. An initial proposed finding of fact for the adjudication of West Fork Carson River water rights was achieved in relatively short time, based on precedents established in the earlier decrees on the West Fork, but similar background for the East Fork was lacking. Other factors serving to delay a decision in the case were the intervention of World War II, during which time little progress was made, and issues arising from proposed reservoir construction under the Bureau of Reclamation's Washoe Project (discussed in the following section).

The Alpine case could be characterized to a large extent as a conflict between individual irrigators on the upper river and the Newlands Project on the lower river, spiced with a few added complications. The years immediately after the initial filing of the suit were marked by a number of attempts to reach a settlement between Bureau of Reclamation representatives seeking to firm up Newlands Project rights and upper river water users, especially in the Carson Valley. The possibility of constructing another reclamation project to serve the upper river irrigators was discussed, and preliminary studies were made of several damsites, including Long Valley near the present-day Mud Lake reservoir.

DWR Division of Safety of Dams



A 1938 photo of the small dam at Upper Kinney Lake, one of the high alpine reservoirs.

Initial negotiations with Carson Valley farmers did not prove successful, and the pace of activity on the suit soon slowed. Interest picked up again in the late 1940s and early 1950s, spurred by the Bureau of Reclamation's studies of additional reservoirs for water supply and power generation on the Carson and Truckee rivers. Although parties were now primed to negotiate, the very fact that new issues had been generated (*i.e.*, how the storage capacity of these proposed reservoirs would be allocated and how the corresponding water rights would be obtained) served to delay progress on the litigation. The parties were, instead, engaged in that perennial pastime of the eastern slope watersheds — debating the universe of water rights. More new subjects for discussion were introduced later in the 1950s when the interstate compact negotiations (covered later in this

The Alpine Decree

Shown below are two excerpts from the Alpine Decree, selected to provide a flavor of its intent. These excerpts highlight the dominance of agricultural water use on the Carson River.

> *"Without the application of water, the lands described above are dry and arid and irrigation is necessary for the production of valuable crops thereon. The respective amounts of water stated above to have been appropriated for or used on these lands, are, in each instance, the maximum amount necessary and sufficient for the reasonable and economical irrigation of crops thereon."*

> *"The lands on which the waters of the Carson River and its tributaries are used lie in an arid region of the United States; to make these lands productive, irrigation thereof is necessary; these lands vary widely in texture, porosity, terrain, inclination, vegetation, crop use, sub-surface stratas and other factors which affect the amount of water necessary to irrigate different portions of said lands and further affect the amount of water which is returned to the main course by drainage and other means; the various areas require, for proper irrigation and crop productivity varying quantities of water per acre. In the Newlands Project, the water duties are 3.5 acre-feet per acre delivered to the land for the bottom-land and 4.5 acre-feet per acre delivered to the land for the bench land. In the lands above the Newlands Project the water duties are 4.5 acre-feet per acre diverted to the canal for the bottom-lands, 6.0 acre-feet per acre diverted to the canal for the alluvial fan lands and 9.0 acre-feet per acre diverted to the canal for the bench lands. The water duties assigned for the various categories of the land are the total duties from whatever source of surface water.*

> *"The net consumptive use of surface water for irrigation on the Newlands Project is 2.99 acre-feet per acre. The net consumptive use of surface water for irrigation of the lands above Lahontan Reservoir is 2.5 acre-feet per acre."*

chapter) began in earnest, contributing to further dilution of the resources available to pursue finishing the Alpine litigation. It was not until 1980 that the court would finally issue the Alpine Decree.

The decree established the respective water rights (to surface water only) of the parties to the lawsuit, parties in both California and Nevada, to Carson River water.[1] It likewise established the rights to reservoir storage in the high alpine reservoirs and confirmed the historical practice of operating the river on rotation, so that irrigators with more junior priorities could be served as long as possible. These upper alpine reservoirs were permitted to fill out of priority order, in accordance with historical practice. The decree also specifically recognized riparian rights in California (as distinguished from the quantified appropriative rights). Duties of water[2] were set forth for various locations.

The Alpine Decree remains the chief regulatory control on Carson River operations today. The decree is administered in the field by a watermaster appointed by the federal district court. The decree's findings and administrative provisions are contained in Appendix 2.

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1 The decree did not make an interstate allocation of the Carson River between California and Nevada; it only quantified individual water rights. Neither state was a party to the decree.

2 The duty of water is the amount of water required to irrigate a given area for a particular crop. The duty is the water supplied to the land, not the water actually consumed by the plants. Duties vary with factors such as soil and crop types, and with the efficiency of the irrigation distribution system.

Activity on the Reclamation Project Front

While the Bureau of Reclamation was spending years in the paper chase of litigation for its Newlands Project water rights on the Carson and Truckee rivers, it was also pursuing more tangible (in the literal sense of the word) goals in the form of proposed reservoir projects. The Bureau had been continuing to investigate possible reservoir sites in the upper watersheds of both rivers and, as part of the settlement achieved in the Truckee River Agreement, had completed construction of Boca Reservoir on the Little Truckee River in 1937. Construction of this facility ushered in the era of new federal projects, projects that, as it was to come to pass, were built in the Truckee watershed and merely studied in the Carson. This section briefly discusses continuing issues on the Newlands Project and studies made in the Carson watershed for the Washoe Project.

The Newlands Project

This project and its initial years have already been covered in some detail. The project's major facilities were completed by the 1920s, including expansion of the initially provided drainage system. From about the time of the signing of the Orr Ditch Decree up to the 1970s, Newlands Project issues remained relatively quiescent.

One point that did surface, however, was that original estimates of the amount of land to be cultivated were quite high. At the turn of the century it was claimed that the project would permit cultivation of over 200,000 acres, and the Bureau of Reclamation obtained rights to Truckee River water under the Orr Ditch Decree for irrigating 232,800 acres.[1] In reality, the Bureau of Reclamation had estimated by 1926 that only about 73,000 acres would be irrigable. Lands irrigated under Newlands Project water rights have historically been about 50,000 to 60,000 acres.[2] Reasons for the lesser amount of irrigated land included drainage-related problems and the high duties of water needed to serve some areas. Also, soil types in some areas were less favorable for cultivation than originally estimated.

The Washoe Project

Authorization of the Washoe Project provided a forum for sporadic negotiations on water issues that began in the late 1940s and continued into the mid-1950s, ultimately helping to bring California and Nevada together to discuss the interstate issues involved. The Bureau of Reclamation had continued to investigate additional upstream reservoir sites on both the Carson and Truckee rivers to serve (primarily) Nevada agricultural interests and to provide hydropower. Flood control needs were also addressed to a greater extent than they had been in the past. The wet years of the early 1950s spurred a renewed interest in flood protection among the communities along both rivers.

The Bureau of Reclamation's studies were formally presented in a 1954 feasibility report. Proposed project facilities for the Carson River watershed included Watasheamu Reservoir, a powerplant at Watasheamu Dam, Dressler Diversion Dam and Afterbay, a canal to serve lands in the Carson Valley, other canals and irrigation laterals, and agricultural drains.[3] The proposed Watasheamu Reservoir, with a

1 Under the Alpine Decree, the Bureau of Reclamation's primary right is simply described as: "The United States is entitled to divert and store the entire flow of the Carson River as it reaches the Lahontan Dam for distribution to the individual farmers on the Project who own the water rights appurtenant to their lands and for generating power."

2 Additional acreage has been irrigated in the Newlands Project area under other claims of water rights; some critics of the project have said that part of this land was irrigated with project water but not under a claim of rights.

capacity of 115,00 acre-feet, would straddle the stateline, with the dam being constructed on the East Fork Carson River just downstream of the stateline. Water released from the reservoir would pass through the powerplant, then part of the water would be diverted into a canal to serve farmers in the Carson Valley (in Nevada). The remaining flow would be released to the river to irrigate some small areas along the river near Empire, Dayton, and Fort Churchill and to serve Newlands Project water users out of Lahontan Reservoir. The water supply created by Watasheamu's construction was to provide for full irrigation of about 5,000 acres and supplemental irrigation for about 114,000 acres (most of which was within the Newlands Project service area).

The State of California initially objected to some elements of the proposed Washoe Project, which covered both the Truckee and Carson rivers, because the proposed project would develop water and power in California for use in Nevada without providing benefits to California. There was concern that rural counties in the California area of origin, which were developing much more slowly than the Nevada regions downstream, could

Churchill County Museum

Putting Newlands Project lands under cultivation required clearing and grubbing, land leveling, and construction of irrigation and drainage canals.

4 Additional facilities were described, but not proposed for immediate construction, to serve the ultimate level of development expected in the region. These ultimate facilities included a reservoir on the West Fork Carson River in Hope Valley in California and associated hydropower plants.

California's Comments on the Washoe Project

In 1955, the California Department of Public Works (Department of Water Resources was then a division within Public Works) prepared a summary of the state's views on the Washoe Project. This summary contained several pertinent recommendations:

> *"...New regulatory storage and water supply for the Washoe Project be based upon the runoffs of the streams in the Truckee and Carson River basins as impaired by present and future use in the areas of origin in California."*
>
> *"...The amount of water which will be available to the Washoe Project be completely determined and defined at an early date through a Nevada-California Interstate Compact negotiated by commissioners appointed by the respective states; that any plan adopted for the project be subject to such modifications as may be required to conform to any compact which may be approved by the legislatures of the respective states of Nevada and California and by the Congress of the United States; and that nothing contained in these comments be construed as constituting a recommendation to a compact commission."*
>
> *"...A dependable water supply be provided to lands in the Carson Valley in California, as well as to those in the same valley in Nevada."*

be deprived of water that would otherwise be available to support local needs in the future. California's objections were sufficiently resolved, after exchange of voluminous correspondence, such that the state did not oppose the project's eventual congressional authorization in 1956.

Construction was eventually to proceed on Washoe Project facilities in the Truckee River watershed. No works, however, were to come to pass in the Carson River watershed. The Watasheamu Reservoir was studied and restudied in various sizes and combinations of features, but was never built. Ultimately the Watasheamu element of the Washoe Project was deauthorized in the congressional water rights settlement legislation discussed at the end of this chapter. The primary strikes against this facility were economic considerations and contentions over water rights — the feeling that waters of the Carson River were already fully appropriated. The ability of low-value agricultural lands to repay facility construction in an era of rapidly escalating water project costs was problematical. Today one Nevada damsite, the Bodie Creek site, once studied for Watasheamu, is again being examined for potential municipal water storage for communities in the Carson Valley/Eagle Valley/Dayton corridor area.

The Interstate Compact Years

Interest in an interstate compact generated by discussions over the Washoe Project bore fruit in 1955, when each state appointed its own California-Nevada Interstate Compact Commission.[1] A congressional statute authorized the states to negotiate a compact and called for appointment of a federal representative to the negotiations. The two commissions worked for about 10 years, together with federal government representatives, to develop a draft version of an interstate compact for three eastern Sierra rivers — Truckee, Carson, and Walker. The purpose of the compact was to allocate use of the waters of these rivers between the two states.

In the Carson River watershed, the proposed compact established allowable diversions from the East and West forks of the river, subject to the historical practice of rotation on the West Fork. It also contained a provision calling for future yield developed from facilities to be constructed under the Washoe Project to be divided on a basis of 80 percent to Nevada and 20 percent to California.

The proposed compact would also establish a permanent commission to administer the compact once it was approved; this body was seen as a way to resolve some of the perpetual disputes over operation of the allocation. It was anticipated that in the Carson basin, for example, this permanent commission might be involved in reconciling the compact allocations with the findings of the long-awaited Alpine Decree. (The Alpine suit was still languishing in court during the time of the compact negotiations, causing uncertainties for the representatives of both states.)

The two commissions and their staff devoted the decade to work such as forecasting ultimate needs for water in the region and performing river operations studies to see if such needs could actually be met within existing water rights constraints. In California's part of the Carson basin, much time was spent on land classification and land use studies to estimate the maximum amount of potentially irrigable land and corresponding consumptive use of water. Studies were also made of the other potentially significant future water need — nonconsumptive recreational and fishery uses. Lake Tahoe levels were debated at length with regard to the lake's use as a reservoir for the Newlands Project and for other Nevada water needs. The Department of Water Resources provided extensive staff support to the California commission in conducting these technical analyses.

What Is An Interstate Compact?

States administer water rights within their own political boundaries, but the process becomes more complicated when an interstate body of water is involved. An allocation of such a body of water can be made between the two states, acting on behalf of their residents, and then each state can issue water rights to its share of the water using its normal administrative process.

There are three possible ways to achieve an interstate allocation:

- *A suit for equitable apportionment brought by the states in the U.S. Supreme Court,*
- *An interstate compact, or*
- *A congressional act.*

An interstate compact is an agreement negotiated by the two states, adopted by the state legislatures, and then approved by Congress. Interstate compacts have traditionally been a common method of making water allocations in the western states. California examples include the Klamath River Compact and the Goose Lake Compact with Oregon.

1 When the two commissions met as one body, they were referred to as the Joint California-Nevada Interstate Compact Commission.

The federal role in the negotiations was confusing at times. The President had appointed a federal participant to the compact negotiations, but the federal government was a relatively inactive participant in this formal role. On the other hand, the Bureau of Reclamation was active in its studies and development of Washoe Project facilities, and issues relating to the project were frequently discussed during the negotiations.

Ultimately, the state legislatures of California (in 1970) and Nevada (in 1971) passed legislation adopting the commission's California-Nevada Interstate Compact. Thereafter, several bills were introduced in Congress seeking ratification of the compact, but none achieved passage. The earlier federal role of quasi-indifference to the compact was changing to one of opposition.

One compact provision particularly troubling to federal agencies was the statement that:

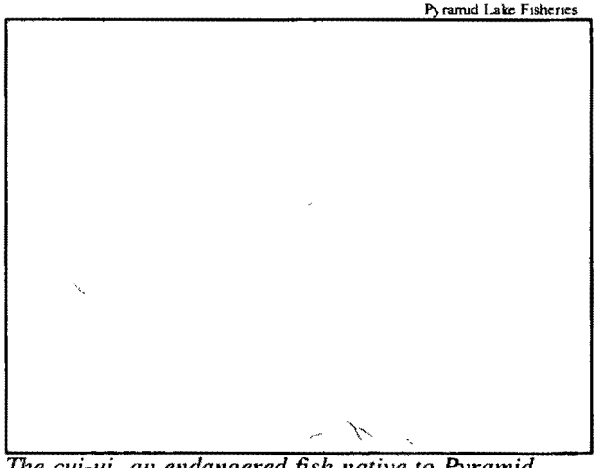
> *"The use of water by the United States of America or any of its agencies, instrumentalities, or wards shall be charged as a use by the state in which the use is made."*

This provision, common to earlier interstate compacts, was seen by the states as necessary in recognition of the major federal water use on these eastern Sierra rivers and the federal ownership or control of all of the largest reservoirs on the Truckee and Carson Rivers.

The compact was also caught in the midst of changing directions in water rights laws and policies. The doctrine of federal reserved water rights was evolving in the courts, and passage of the Endangered Species Act gave the federal government additional responsibilities for listed species. The Newlands Project now became involved in a new legal controversy — the impact of its diversions of Truckee River water on listed fish species in Pyramid Lake. Pyramid Lake, at the Truckee River's terminus, is home to two listed fish species — the cui-ui, a large omnivorous sucker, and the Lahontan cutthroat trout. The decline in Pyramid Lake levels caused by Newlands Project exports to the Carson basin was alleged to be adversely impacting these fish, beginning a long series of legal actions, covered in the next section. Both the Pyramid Lake Paiute Tribe, whose reservation surrounds the lake, and the federal government began to seek more water for Pyramid Lake, upsetting the balance of interests that had prevailed in the compact negotiations.

The last of the bills for which congressional approval was sought was introduced by former Nevada Senator Laxalt in 1986 after failure of his attempts in 1985 to negotiate a settlement of the outstanding issues. With defeat of the 1986 attempt, the parties tacitly agreed that pursuing compact ratification was fruitless.

Pyramid Lake Fisheries



The cui-ui, an endangered fish native to Pyramid Lake. The cui-ui is a large omnivorous sucker that can grow to about 2 feet long and is remarkably long-lived. Females can live for up to 45 years, and males may reach their late 20s.

An Assortment of Litigation

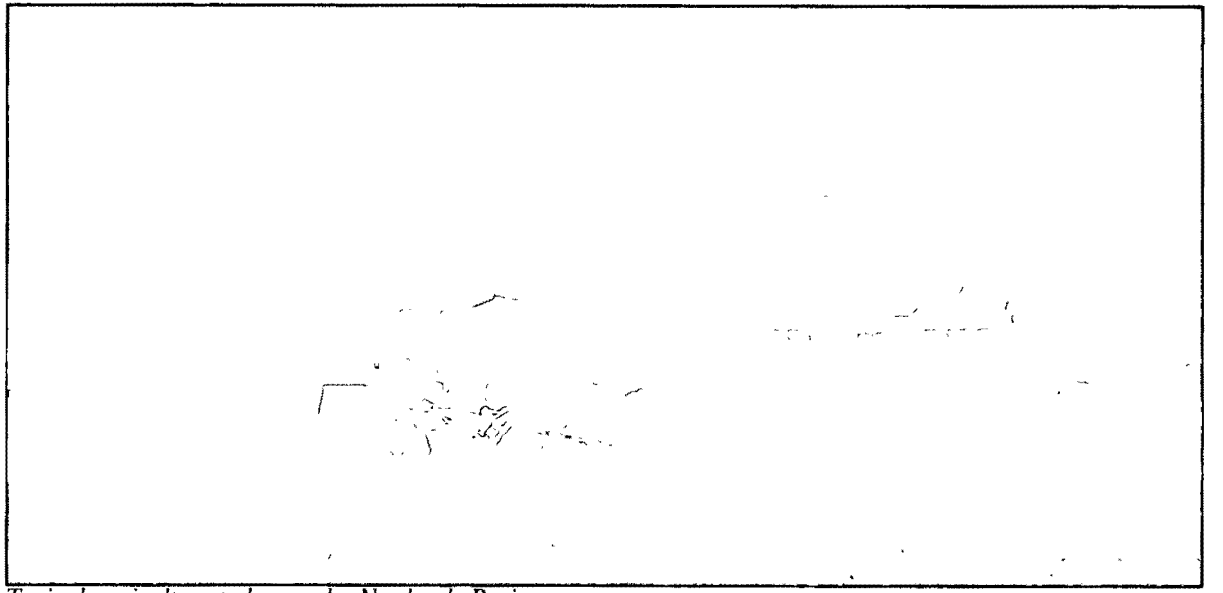
Some of these same federal reserved rights and environmental issues were being addressed in litigation that was proceeding concurrently with the compact negotiations and attempts at ratification. A number of suits were filed by the United States and by the Pyramid Lake Paiute Tribe of Indians seeking more water for Pyramid Lake under various claims of rights. The purpose of this section is not to go into great detail on the theories behind these suits, but instead to illustrate the recent conflicts between the agricultural water users and those who want the water reallocated to serve other purposes.

One of the major disputes is known as the OCAP litigation, named after the Operating Criteria and Procedures for the Newlands Project. The OCAP itself arose from the Bureau of Reclamation's efforts to develop a method of Newlands Project operation that would maximize use of Carson River water on the project and minimize diversion of Truckee River water via the Truckee Canal into Lahontan Reservoir. This concept was a response to the 1967 listing of the Pyramid Lake cui-ui under the federal Endangered Species Act.

The major parties in the OCAP disputes have been the Pyramid Lake Paiute Tribe, Bureau of Reclamation, and Truckee-Carson Irrigation District. In the first of the OCAP actions, the Tribe sued the Secretary of the Interior (the Bureau of Reclamation is an entity within the U.S. Department of Interior) on the grounds that the OCAP provided the project water users with more water than that to which they were entitled. The resulting 1973 decision, informally known as the Morton decision, held that water was being wasted in the Newlands Project and that the Bureau of Reclamation was required to deliver to Pyramid Lake the water in excess of valid Newlands Project rights. The Bureau of Reclamation subsequently began to issue an interim OCAP each year, eventually followed by a proposed final OCAP. The goal was to cut Truckee Canal diversions to a maximum of 320,000 acre-feet per year (a reduction of 40,000 to 50,000 acre-feet per year from historical levels), still a substantial portion of the Truckee River's annual flow.

Meanwhile, further OCAP litigation continues. Questions that have been or are being argued include:

- The definition of bench and bottom lands on the project (relative to the quantities of water they are allotted),
- Irrigation efficiencies, and
- Alleged lack of compliance by Truckee-Carson Irrigation District with various interim OCAPs.



Typical agriculture today on the Newlands Project.

A variety of OCAP-related issues remains in dispute today, betokening the competition for the large block of water that represents the project's supply. The most recent developments on the OCAP front are contained in the water rights settlement legislation discussed in the next section.

The OCAP disputes have been portrayed as creating a classic conflict in natural resources management, pitting fish against fowl. This trade-off has been debated at length over the course of the various actions, with the supporters of Lahontan Valley wetlands seeking to preserve the water supply that the Newlands Project indirectly provided to the wetlands. The wetlands have received water from several sources: Carson River floodwaters in wet years, excess water used on the project, agricultural tailwater, and water from the project's drain system. Attempts to impose OCAP limitations and to make the Newlands Project operate more efficiently, coupled with several dry years, contributed to substantial reductions in wetlands acreage.[1] The desire to provide more water for listed fish species at Pyramid Lake had to be weighed against the desire to maintain wetlands habitat for waterfowl and migratory shorebirds in Lahontan Valley. Ultimately, part of the proposed solution was to purchase water rights specifically for the wetlands.

Other court cases were proceeding concurrently with the OCAP activities, focusing on suits filed by the United States and by the Tribe against water users on the Truckee River, again seeking more water for Pyramid Lake. The Tribe also filed suits over operation of some Truckee River reservoirs, including operation of Lake Tahoe Dam to serve the Newlands Project. This 1987 case originated when the Bureau of Reclamation circulated environmental documentation for repairing the dam to improve its earthquake resistance. The Tribe then filed suit against the federal government over impacts of the dam's operation on listed fish species in Pyramid Lake, and both states and the perennial litigants over Truckee River water rights intervened in the action. Further legal action in this case has been placed on hold pending the outcome of settlement negotiations described in the next section.

Congressional Settlement Legislation

The latest effort to resolve the water wars has been enactment of congressional settlement legislation for the Truckee and Carson rivers. Negotiation of this legislation was begun in 1988 by Nevada Senator Reid. The scope of these new negotiations included:

- The interstate allocations of the old compact.
- Settlement of some of the litigation over rights to Truckee River water.
- Settlement of other Indian water rights issues.
- Reoperation of the Truckee River to provide drought period water supply for the Reno/Sparks area.
- Water rights purchases for the Lahontan Valley wetlands.
- Recovery plans for the listed Pyramid Lake fish.
- Newlands Project reauthorization.

1 Water management on the Newlands Project is inefficient by modern standards, reflecting the project's age and its lack of modernization and major maintenance since its construction in the early part of this century.

Many parties were involved in the negotiations — public agencies, water users, and environmental groups. Primary players in the negotiations over interstate allocations were the two states, the federal government, the Pyramid Lake Paiute Tribe, and Sierra Pacific Power Company. The Department of Water Resources represented California, with assistance from the State Water Resources Control Board and in close consultation with local governments and water users.

The legislation, known as Public Law 101-618, was approved by the 101st Congress at the end of its 1990 session. The legislation is divided into two acts: the Fallon Paiute Shoshone Tribal Settlement Act and the Truckee-Carson-Pyramid Lake Water Rights Settlement Act. Appendix 1 contains a copy of the legislation. Its key provisions are outlined below, then provisions relating to Carson River water issues are covered in more detail.

The main topics covered by the legislation are:

» The Fallon Paiute Shoshone Tribal Settlement Act establishes a settlement fund for this tribe totaling $43 million. The Tribe is authorized to purchase land and water rights to consolidate tribal holdings within the reservation. Specified litigation involving the Tribe must be dismissed.

» An interstate allocation is made of the use of waters of the Truckee and Carson rivers. Provisions are made for transfer of water or water rights.

The Fallon Paiute Shoshone Tribe

The Fallon Paiute Shoshone Tribe has a reservation just east of Fallon in the Stillwater area. The tribe has been involved with the federal government for some years in efforts to improve the reservation's irrigation system and water supply. The reservation's history began in 1890, when the federal government made 50 allotments of 160 acres each to individual Paiute and Shoshone Indians under the General Allotment Act of 1887. Additional allotments were subsequently made until ultimately about 31,000 acres of land in the area later to become the Newlands Project had been allocated to tribal members. With the authorization of the Newlands Project, the acreage that had comprised the Indian lands was, instead, slated for the project, and the Indian allotees were each offered contracts for 10 acres of irrigated land in exchange for their 160 acre allotments. The lands the Indians were to receive were to be supplied with irrigation facilities, project water rights, and water free of charge in perpetuity. In 1907 the federal government created a reservation of 4,640 acres for those Indians who had accepted the 10-acre allotments, although much of this land was not irrigable. In subsequent decades the government failed to meet its contractual obligations to the tribe, and much of the promised water and irrigation facilities were not forthcoming. The reservation was eventually expanded to a total of 8,120 acres to support a present tribal membership of about 850. Congressional legislation passed in 1978 called for the government to compensate the Tribe for federal nonperformance on the early land exchange contracts by acquiring more land for the reservation and providing a complete irrigation system. Provisions of this legislation were not carried out because of later conflicts with endangered species concerns at Pyramid Lake and the limitation on Newlands Project irrigated acreage imposed by the OCAP. The Fallon Paiute Shoshone Tribal Settlement Act included in Public Law 101-618 is intended to compensate the Tribe for the government's failure to carry out its obligation under earlier contracts or legislation, including the 1978 legislation.

» A new operating agreement is to be negotiated for the Truckee River, covering procedures for using storage capacity in the upstream reservoirs in California.

» A water rights purchase program is authorized for the Lahontan Valley wetlands, with the intent of sustaining an average of about 25,000 acres of wetlands.

» A recovery program is to be developed for the Pyramid Lake cui-ui and Lahontan cutthroat trout. Water rights acquisitions are authorized. A tribal economic development fund of $40 million is established for the Tribe. Another fund of $25 million is established for the lake's fishery.

» The Newlands Project is reauthorized to serve additional purposes, including recreation, fish and wildlife, and municipal water supply for the Fallon area. A project efficiency study is required. The 1973 Morton decision and final OCAP are recognized, and the Secretary of the Interior is directed to enforce compliance with the OCAP.

» A number of contingencies are placed on the effective date of the legislation, and various parties to the settlement are required to dismiss specified litigation.

The Carson River interstate allocations made by the legislation are based to a large extent on existing water uses contained in the Alpine Decree. The act also makes some small further allocations beyond the water rights covered in the decree, recognizing existing water rights held under state law that were not included in the decree. The water rights forming the basis for these further allocations must have been in existence as of January 1, 1989, and they cannot result in additional diversions from the Carson River after December 31, 1992. The Carson basin allocation also contains special provisions regarding California's ability to develop a substitute water supply, up to 2,000 acre-feet per year, to compensate for any future termination of the existing waste water export[1] from the Lake Tahoe basin into the Carson watershed in California.

The legislation contains a number of provisions regarding how these interstate allocations will be measured and reported, but leaves some details regarding administration of the allocations to be worked out by the parties. The allocations, together with other parts of the act, will not take effect until several contingencies are satisfied.

California's inclusion of a portion of the East Fork Carson River from Markleeville to the stateline in the state's Wild and Scenic Rivers System is recognized by stating that reservoirs constructed on the East Fork by Nevada interests may not back water up over the stateline. This provision was included as a result of the various studies being undertaken for a Nevada reservoir project to replace the Watasheamu Reservoir of the Washoe Project. Several sizes of reservoirs were being considered for a local project, some of which could have inundated a small portion of the East Fork in California.

Counteracting the decline in wetlands acreage in the Lahontan Valley is another key element of the settlement legislation. The act authorizes the federal government to buy water rights from willing sellers to sustain an average of about 25,000 acres of wetlands habitat, corresponding to water rights purchases on the order of 50,000 to 60,000 acre-feet, and provides for use of Newlands Project facilities to supply this water. Authorization is also given for actions to remedy water quality problems associated with the project's agricultural drainage, which has been a major source of water supply to the wetlands. The existing Stillwater National Wildlife Refuge is expanded to encompass about 77,500 acres of land, and federal lands comprising the Indian Lakes area adjoining Stillwater are to be transferred to either the State of Nevada or to Churchill County to be managed for fish, wildlife, and

1 The exported waste water serves as a supplemental irrigation supply to Alpine County ranchers.

Mud Lake is one of the high alpine reservoirs included in the Alpine Decree. One recently proposed water transfer under discussion would store water held under former agricultural rights in this reservoir for sale to downstream, presumably municipal, water users.

Interstate Water Transfers

One of the most difficult subjects in negotiation of the interstate allocations proved to be the question of the interstate transfer to one state of water or water rights that had been allocated to the other state. Such a transfer could occur by virtue of an individual or entity buying water rights in one state and changing the place of use to the other. Negotiating this issue required steering between the Scylla of unregulated transfers that might cause adverse third-party environmental or economic effects and the Charybdis of an outright ban on transfers. Because of differences in the existing court decrees on the Carson and Truckee rivers, this issue was handled differently in the two basins. The provision governing transfers in the Carson basin is excerpted below.

> *"The jurisdiction of the Alpine court to administer, inter alia, interstate transfers of water or water rights on the Carson River under the Alpine decree, pursuant to jurisdiction reserved therein, including any amendment or supplement thereto, is confirmed. Each State may intervene of right in any proceeding before the Alpine court wherein the reserved jurisdiction of that court is invoked with respect to an interstate transfer of water or water rights, and may report to the court findings or decisions concerning the proposed change which may have been made by the State agency responsible for administering water rights under any State law applicable to transfers or change in the point of diversion, purpose of use, or place of use of water."*

recreation. Federal lands under Bureau of Reclamation management in the Carson Lake Pasture area at the other end of the Carson Sink are likewise to be transferred to the state for use as a state wildlife refuge.

The last major Carson River issue covered in the legislation is reauthorization of the Newlands Project. As was typical of early reclamation projects, the Newlands Project's only authorized purpose was supplying irrigation water, although collateral benefits had developed over time, particularly those involving incidental supply of water to the wetlands. The act specifically adds additional purposes to the project — fish and wildlife, municipal and industrial supply for Lyon and Churchill counties, recreation, and water quality. Use of project facilities to provide water bank storage for water rights holders for drought supply or other purposes is authorized, subject to specified conditions. Several studies are referenced: a mandatory project efficiency study and study on reuse of waste water effluent for the wetlands, and a possible study on Lahontan Reservoir recreation. The act contains a lengthy section on the OCAP, affirming the 1973 Morton decision and fixing the 1988 OCAP as the target for project operation through 1997. The Secretary of Interior is directed to enforce OCAP compliance and to seek recoupment of excess water diverted to the project in past years in violation of the then-extant OCAPs.

Looking Toward the Future

The earliest date by which key provisions of the settlement act can take effect is 1997, because of the act's many contingencies. The interstate allocations, for example, cannot take effect until an operating agreement is negotiated for the Truckee River, the last federal payment is made to the Pyramid Lake Paiute Tribe's development fund, and specified litigation over Truckee River water rights is dismissed. Satisfying these contingencies, especially negotiation of a Truckee River operating agreement, promises to be at least as complicated as the history of water negotiations on these rivers would presage. Setting up a system to administer the interstate allocations and to administer state water rights in compliance with them is another task that will need to be done.

A Summary of Key Dates

1902	*Federal Reclamation Act is enacted.*
1905	*Anderson–Bassman Decree is issued.*
1913	*U.S. v. Orr Ditch Water Company begins.*
1915	*Truckee River General Electric Decree is issued.*
1921	*Price Decree is issued.*
1925	*U.S. v. Alpine Land and Reservoir Company begins.*
1935	*Truckee River Agreement is signed.*
1944	*Orr Ditch Decree is issued.*
1970	*California Legislature approves the proposed interstate compact.*
1971	*Nevada Legislature does likewise.*
1980	*Alpine Decree is issued.*
1990	*Truckee-Carson-Pyramid Lake Water Rights Settlement Act is enacted.*

Chapter 6

USES OF THE CARSON RIVER

This chapter highlights some uses of the Carson River and describes how some of these uses have changed over time. Both consumptive uses (*e.g.*, municipal and agricultural) and nonconsumptive uses (*e.g.*, hydropower and recreation) are covered.

The terms consumptive use and nonconsumptive use are traditionally associated with water rights and water use studies, but they are not completely definitive. No typical consumptive use is 100 percent efficient; there is always some return flow associated with such use. In the case of water diverted for municipal use, most of the water used inside a residence ultimately reaches a septic tank or sewer system, and this water returns to the environment in the form of ground water recharge or direct discharge from a waste water treatment plant into a river. In the case of agricultural use, the example in Chapter 5 of duties of water in the Alpine Decree explicitly recognized conveyance losses in the delivery of water to farms by specifying whether the duty was measured at the point of diversion or at the farm headgate. Once the delivered water actually reaches the field, some is then used by the plants, some evaporates, some reaches ground water, and some returns to surface streams.

Nor are typical nonconsumptive uses of water entirely nonconsumptive. There are evaporation losses, for instance, associated with maintaining a reservoir at a specified elevation to support fish, recreation, or hydropower, and there are conveyance losses associated with maintaining a minimum streamflow in a river. Such losses are sometimes expressly quantified in water rights permits or agreements, as mentioned later in this chapter. An interesting twist can arise when a water right for a consumptive use such as irrigation is purchased to support a nonconsumptive use such as lake level maintenance for fish. The purchaser of the right may be required to release a portion of that water into the stream, because downstream interests (either other irrigators or instream users) relied on the return flow from that consumptive right to supply part of their own water rights. The rights of these downstream interests would thus be injured if no water were released to replace the return flow.

The Return Flow Concept

Understanding the concept of return flows is important in the context of water rights. Downstream water users may derive a portion of their entitlement from return flows of upstream users.

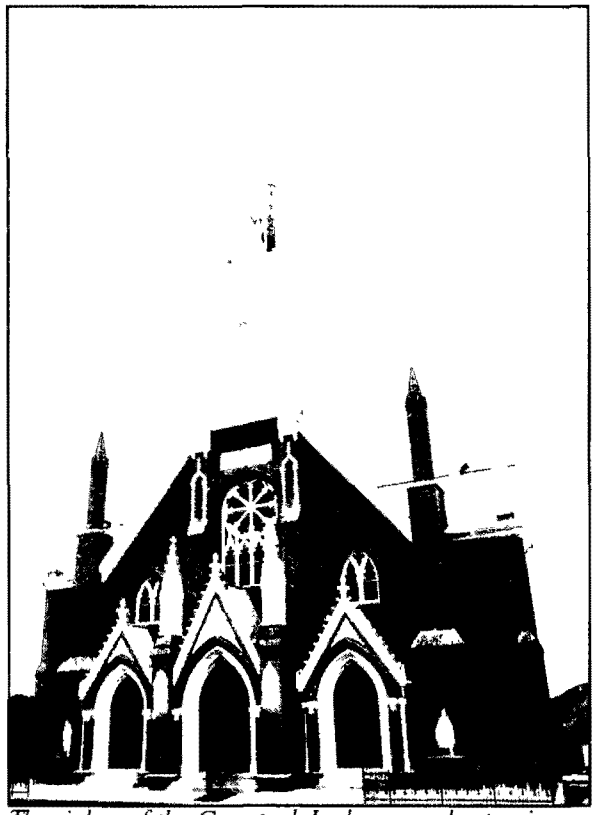
For example, water rights on some of the ditches in the Alpine Decree are based on expected return flows from upstream irrigators. The downstream diverters on these ditches take their allotted diversions and, in turn, a share of that water eventually returns to the sloughs that feed into the Carson River in the Carson Valley. Some of this multiply "recycled" water will eventually reach the Newlands Project, where, after its use to irrigate crops, this water will reach the wildlife area at Stillwater in the form of tailwater or agricultural drainage. One of the points brought out in the process of issuing Newlands Project OCAPs was that the wetlands could be hurt by increased irrigation efficiencies on the project, because return flows reaching the wetlands would be diminished.

Although most of this chapter is directed toward surface water use, it must be remembered that the use of surface and ground water resources is inextricably intertwined. River water may recharge a ground water basin, or ground water may contribute to flow in the river. In the Carson basin overall, most municipal users are, in fact, supplied from ground water, with surface water supply being largely the province of irrigators.[1]

Changing Times, Changing Uses

As with many western rivers, the history of the Carson includes a period of early exploitation of natural resources — lumbering and mining, followed by a time of homesteading and farming, and in the most recent decades a time of increasing urbanization and sensitivity to environmental needs.

Some of the earliest large diversions in the watershed were those associated with lumbering and mining — water to supply the needs of the Comstock, river regulation to permit logs to be floated down the river to a mill or into a flume, and water to power generators at the mills. In marked contrast with later water uses, the largest of these early water diversions were nonconsumptive, mirroring the region's low population levels and high need for sources of power and transportation.



The riches of the Comstock Lode spurred extensive development in Virginia City. Many of the earliest structures were destroyed in a fire that consumed much of the town in 1875, but the wealth of the mines provided the capital for rapid reconstruction. Saint Mary's in the Mountains, a Virginia City landmark and one of its more elaborate surviving structures, was rebuilt after the fire.

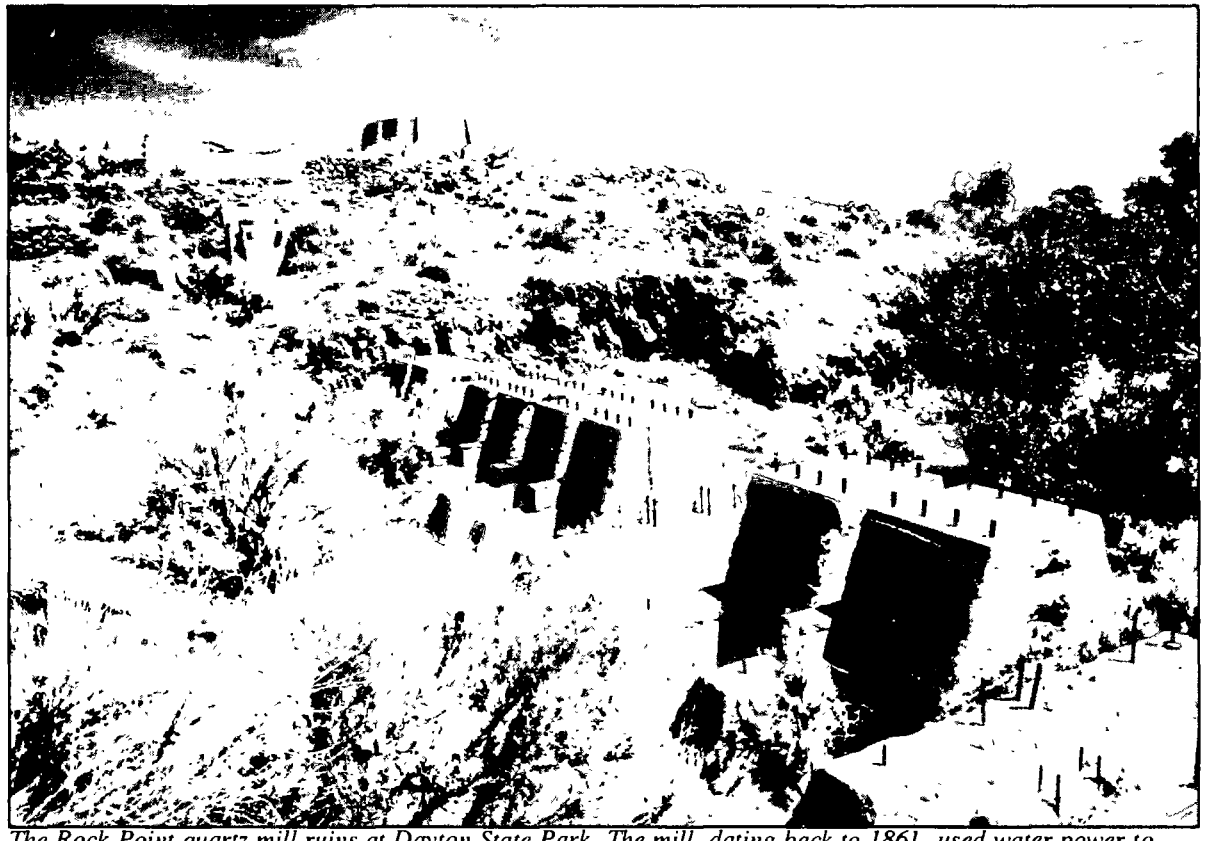
Agricultural uses in these first years of settlement were fairly primitive, at first being little more than assisting the river's natural tendency to flood irrigate low-lying pasture lands in the Carson Valley and upper watershed. One holdover from this early agricultural practice can be seen in the Alpine Decree's frequent use of the term "natural grass" to mean the irrigation of uncultivated meadowlands. Later agricultural uses focused on the Newlands Project and Carson Valley areas, with a lesser amount of agricultural use in the upper watershed in California. It is no exaggeration to say that the Newlands Project has, since its inception, effectively dominated Carson River water issues and water use (as well as having a great deal to do with the water wars on the Truckee River).

Most recently, Carson River water issues are reflecting growing recognition of the emerging societal values that encourage allocating

1 Surface water use in the basin far overshadows ground water use; in its report on ground water referenced in Appendix 3, the U.S. Geological Survey has estimated that 93 percent of the water use in the lower watershed from Carson Valley downstream was based on surface water.

water to ecological needs. Thus we see the linkages made between the Newlands Project and water needs for the Lahontan Valley wetlands and the transfer of upper watershed lands from private agriculture to public ownership. Irrigated acreage (actually irrigated pasture for livestock) has decreased over time in the upper watershed in California; the cold climate precludes most agriculture other than seasonal grazing, and transfers of land to the U.S. Forest Service have taken some of this formerly irrigated land out of production.

Present-day water uses in the basin are described in the following sections.



The Rock Point quartz mill ruins at Dayton State Park. The mill, dating back to 1861, used water power to run its stamps. A sign at the mill site reads:

ROCK POINT MILL

1861 TO 1882 FIRE. 8 5-STAMP BATTERIES DRIVEN BY 13' AND 16' WATER WHEELS ABLE TO CRUSH 40 TONS OF ORE DAILY — REBUILT 9–1883, WITH 36 LEFFEL WATER TURBINE, UNTIL FIRE OF 1909 THENCE IN 1910, REBUILT, "NEVADA MINING REDUCTION AND POWER CO." WITH NEW AERIAL TRAMWAY CARRYING GOLD HILL ORE

Union Mill and Mining Company v. Ferris et al.

This case was heard by the circuit court for the District of Nevada, and a decree was issued in 1872. The case was one of a group of suits that mill owners on the Carson River filed against Carson Valley irrigators, alleging that the upstream irrigation diversions impaired the mill owners' rights for water to power the mills. The three excerpts below from Judge Sawyer's opinion on the case provide an interesting view of the competition between appropriative and riparian water users at the time.

> *"The complainant [the mill owners] denies his right to use the water for irrigation to its injury in any degree. The defendant, on the other hand, claims that in a hot and arid climate like ours, water may not only be used for that purpose, but is a natural want, like the thirst of men and cattle, to satisfy which the riparian proprietor, who has the first opportunity may consume, if necessary, the whole stream, and that such use under the conditions existing here is reasonable."*
>
> *"These two cases are the only ones referred to as sustaining the defendant's claim that water for irrigation is, in this climate, a natural want, and we are asked to class it with the want of water to quench thirst of men and cattle. To put the use of water for irrigation upon the same footing as the use of it to satisfy thirst, is to say that an upper proprietor may take the whole stream, if needful to the growth of vegetation upon his land, and leave those below him without water to drink. This certainly cannot be law in any climate. But 'water for irrigation' is not a natural want in the same sense that water to quench thirst is."*
>
> *"In regard to the comparative benefits derived by our community from mining and agriculture, or the injury which it will sustain by fostering one at the expense of the other, they may be questions involved in the consideration of what constitutes a reasonable use. Irrigation must be held, in this climate, to be a proper mode of using water by a riparian proprietor, the lawful extent of the use depending on the circumstances of each case."*

Agricultural Water Use

Newlands Project agriculture in the Carson basin is the largest water user on both the Truckee and Carson rivers; principal crops are irrigated pasture, alfalfa, and grains. Project lands in the basin are served entirely by surface water stored and regulated at Lahontan Reservoir. The OCAP presently calls for a limit on Truckee Canal diversions of 320,000 acre-feet per year, corresponding to just over half of the Truckee River's average annual flow at the stateline.[1] The project is additionally entitled to the entire flow of the Carson River at Lahontan Reservoir, amounting to an average annual flow of about 271,000 acre-feet per year.

In its 1987 environmental impact statement for the OCAP, the Bureau of Reclamation estimated there were about 68,000 acres with Newlands Project water rights in the Carson Division below Lahontan Dam. Although the project is the river's largest water user, water rights associated with it are relatively junior by local standards, with none of its Truckee River rights having priorities earlier than 1902 or 1903. The project's right on the Carson River to all of the river's terminal flow lacks a specific temporal priority, but is perforce protected from upstream diverters whose priorities are fixed in the Alpine Decree. The project also holds a handful of individual irrigation rights with varying priorities, acquired under contract from early settlers in the Fallon area.

Carson Valley is the basin's next largest agricultural area with about 47,000 irrigated acres, according to the Geological Survey. This valley is one of Nevada's oldest agricultural areas, a fact reflected in some early

Agricultural Water Conservation

One of the myriad of issues addressed in negotiation of the recent water rights settlement act was use of irrigation water at Fallon Naval Air Station, which is served by the Newlands Project. Navy lands around the base's perimeter have been leased to local farmers, primarily for alfalfa cultivation. These leased lands are intended to provide a buffer zone around the active portion of the base for fire protection, dust control, and control of wind-blown debris that could damage jet engines. The Pyramid Tribe had for some time advocated that the alfalfa should be replaced with a lower water use ground cover, so the water saved could be dedicated to Pyramid Lake. Ultimately, the water rights settlement act directed the Secretary of Interior to examine land management and water conservation plans, with the goal of redirecting any water that could be conserved to Pyramid Lake (primarily) or to the Lahontan Valley wetlands. One provision of note in the act states:

> *"The Secretary of the Navy, in consultation with the Secretary of Agriculture and other interested parties, shall fund and implement a demonstration project and test site for the cultivation and development of low-precipitation grasses, shrubs, and other native or appropriate high-desert plant species, including the development of appropriate soil stabilization and land management techniques, with the goal of restoring previously irrigated farmland in the Newlands Project area to a stable and ecologically appropriate dryland condition."*

This policy direction is in marked contrast to the turn-of-the-century drive to "make the desert bloom" in the Newlands Project area.

1 Actual average annual inflow has been about 193,000 acre-feet per year, as measured by the U.S. Geological Survey. The U.S. Bureau of Reclamation has estimated that the long-term average annual diversion to the canal has been somewhat higher than the USGS figure, based on a longer period of hydrologic record. Part of the water diverted at the canal serves lands within the project's Truckee Division, but most of the water ultimately reaches Lahontan Reservoir.

OCAP Review Comments

The OCAP and related disputes are some of the most sensitive Nevada water issues on the Truckee and Carson rivers today. The three quotations below, taken from the Bureau of Reclamation's 1987 *Final Environmental Impact Statement for the Operating Criteria and Procedures*, are provided to emphasize some of the diverse views on how the river's resources should be used. The quotations are excerpted from comments submitted by interested parties on the draft EIS.

The Environmental Defense Fund

"...the OCAP should be designed to limit water diversions only to amounts necessary to meet actual and reasonable demands, and should incorporate an equitable approach to sharing water shortages. Required delivery efficiencies should also be established and enforced. In determining project demands, the EIS should fully address factors which influence both present and potential future demand, such as water prices, the potential for water markets, and future farm commodity markets. A realistic analysis of such factors — and the creation of incentives to encourage more efficient use of water — would demonstrate the extent to which sufficient water can be saved to assure the necessary flows to Pyramid Lake, while still providing clean water to preserve the existing Lahontan Valley wetlands.

"Because of its dominant role in the Newlands crop mix (some 70 percent of Newlands acreage), alfalfa serves as a notable example of the potential impact of even moderate changes in pricing mechanism. Relative to a wide range of alternate crops, alfalfa exhibits high water use per acre, high diversion requirements (i.e., low efficiencies), comparatively low dollar yields per AF of water consumed, and secondary markets which are either deteriorating (e.g., declining per-capita beef consumption) or already glutted (e.g., dairy subsidies). Because of these factors it is evident that even minor pricing reforms could have major impacts on overall crop mix, crop acreage, and efficiency of water use, resulting in significant reductions in actual project demands and diversion requirements."

The Pyramid Lake Tribe's Legal Counsel

"The proposed action and the Draft EIS are deficient because they are based entirely on the maximum decreed water duties rather than actual, reasonable and economical beneficial use. There is no attempt to limit the use of water to the amount actually required for reasonable and economical beneficial use. The Secretary's responsibility and obligation to limit use of water to reasonable and economical beneficial use are established by the attached....

"In 1973, Secretary Morton specifically notified TCID that every acre foot of illegally diverted water would have to be returned to Pyramid Lake.... Knowing the risks and consequences, TCID nevertheless deliberately violated the OCAP for 10 years — illegally diverting approximately 1,000,000 acre feet."

Truckee-Carson Irrigation District

"The Newlands Project was constructed during the early part of this century and was never designed or constructed for maximum efficiency. There are many miles of earthen canals which support not only the irrigation district water users but which support an ecosystem within the Lahontan Valley. There are many homes and other domestic uses that are dependent on the ground water recharged by the water in the canals as well as wildlife that has developed a dependence on the water system.

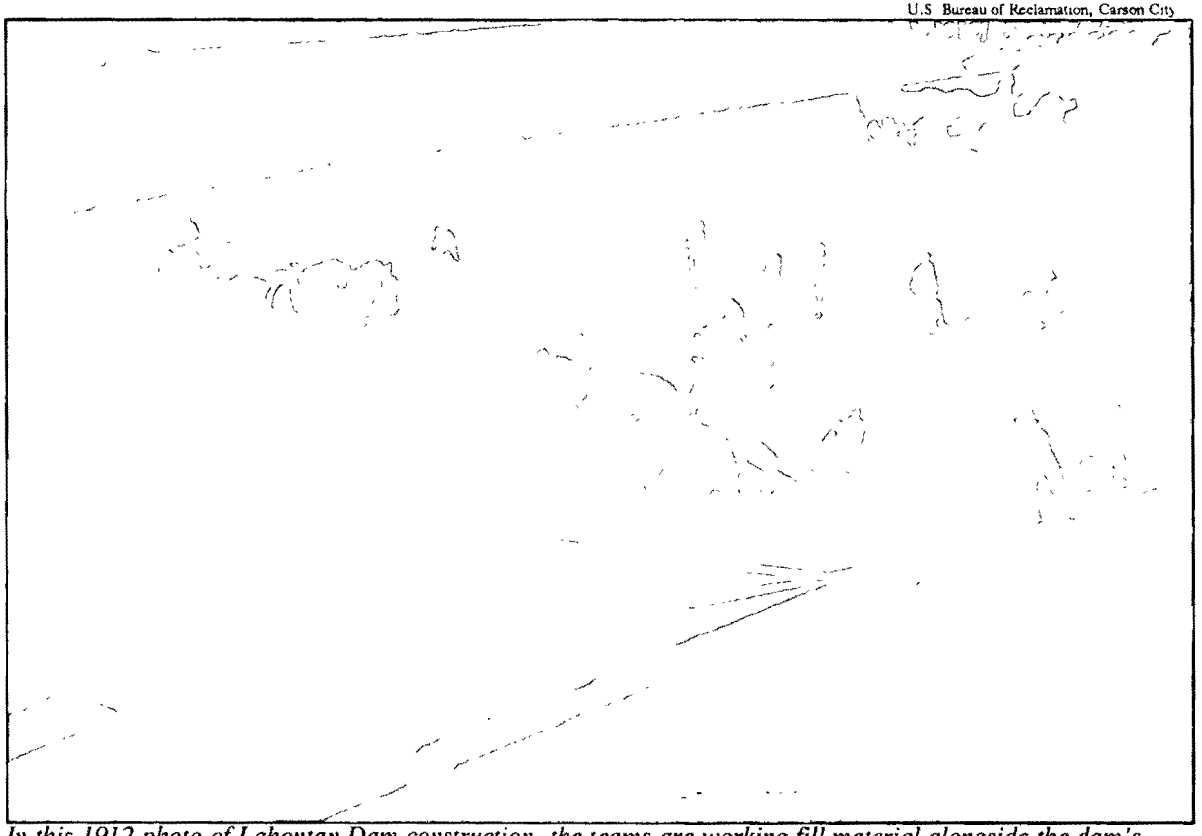
"There are very few, if any, occasions where project water is delivered to non-water righted ground. Most instances are where the individual water user has leveled portions of his ground and incorporated them into his irrigated fields. These areas were previously classified as non-water righted because they were sand hills and couldn't be irrigated. Today's technology and machinery make it easy to remove the sand hill and to irrigate them [sic] along with the remainder of a water user's field."

water rights priorities. Agricultural water supply in the valley comes from a combination of direct diversion of surface water from an extensive system of privately owned ditches and from stored water in the upper alpine reservoirs. Individual ranchers also extract minor amounts of ground water, particularly as a supplemental source of supply in dry years.[1] Irrigated acreage in this valley may decrease in the future with the continuing expansion of the suburban Minden/ Gardnerville area onto agricultural lands.

Other, much smaller areas of irrigated land in Nevada are found in Dayton, Churchill, and Eagle valleys, where agricultural has developed on bottomlands along the river's path. These areas are served almost entirely by direct diversion of surface water.

In California, the majority of the irrigated acreage (served only from surface water) is concentrated in Diamond Valley and in the upper end of the adjoining Carson Valley. The face value of decreed irrigation rights in California was slightly under 24,000 acre-feet per year when the Alpine Decree was issued. Actual agricultural water use is less, since the face value of the rights does not take into account their priorities; only in wet years are the rights with more junior priorities fully met. This figure also does not reflect transfers of privately owned agricultural lands to the Forest Service that occurred after issuance of the decree.

U.S. Bureau of Reclamation, Carson City



In this 1912 photo of Lahontan Dam construction, the teams are working fill material alongside the dam's concrete cutoff wall.

A few scattered areas in the upper watershed in both states receive a small irrigation supply from the export of Lake Tahoe basin waste water. The largest single application site is in Alpine County's Diamond Valley area, where 4,000 to 5,000 acre-feet per year of treated waste water from South Lake Tahoe provide a supplemental irrigation supply.

Some decreed irrigation rights in the upper watershed are gradually being converted to municipal use, or being proposed for such conversion, due to downstream urban or suburban development in Eagle and Carson valleys. One recent proposed transfer, known

1 Carson Valley contains the most significant aquifer system of usable quality water in the basin, but this supply has yet to be extensively developed.

as the Aqueduct I transfer, involved a limited partnership that proposed to transfer upstream irrigation rights to Mud Lake (pictured on page 85), from which they would be sold to municipal users. This controversial transfer is being protested by other irrigators who fear their rights may be injured.

Water transfers are a fact of life in the river basins of the eastern Sierras; their commonplace nature is attested to by the *Reno Gazette's* routine heading in its classified advertisements section for water rights sales.

Municipal and Industrial Water Use

Most municipal water users in the basin are supplied from ground water sources. Throughout the basin, many homes are served from private wells, especially homes not located in the main areas of urban or suburban development. Ground water extractions are not regulated in California; Nevada's water rights permit system does include ground water. The Alpine Decree, which covers surface water only, includes but few municipal water rights.

The tiny community of Markleeville, in Alpine County, is one of the few municipal users of a decreed water right. The area's few hundred users are served from a surface water diversion on Musser and Jarvis Creek, which has a priority of 1862. The community also has the ability to obtain ground water as a supplemental supply. Finding a ground water supply in the immediate vicinity of Markleeville is constrained by areas of poor water quality, where highly mineralized water is associated with hot springs activity.

The interstate allocations in the water rights settlement act will, when the provisions take effect, limit California surface water diversions to those now recognized in the Alpine Decree plus the minor additional amount of water rights perfected under state law. If Markleeville desired to expand its existing surface water supply system, it would need to do so by acquiring existing irrigation rights for conversion to municipal use.

Ground water is the source of supply for the communities downstream in the Carson Valley — the Minden/Gardnerville suburban area, with water service being provided by a number of small public and private water systems.[1] This valley, the watershed's largest ground water basin with potable-quality water, offers prospects for expansion of municipal supplies from ground water and could have potential for a managed program of conjunctive use of ground and surface water in the more distant future. In the shorter term, new municipal supplies could be obtained by purchasing existing agricultural rights and converting them to municipal use. Ground water extractions in the Nevada portion of the valley are regulated by the State Engineer, who has designated the ground water basin, meaning extractions are limited based on the average annual ground water recharge, because of concerns that overdrafting could occur.

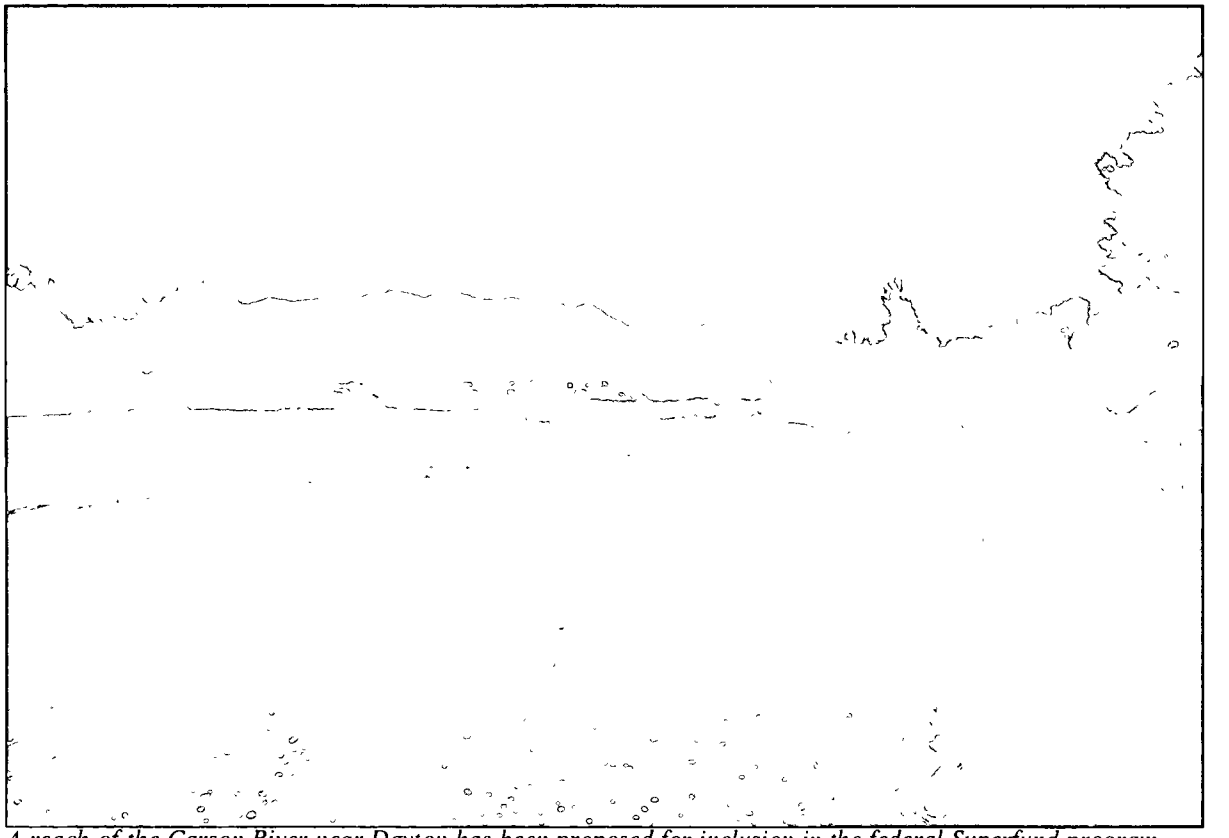
The Carson City area, the largest municipal user in the watershed, derives its water supply from a mix of sources — local tributaries to the Carson River and ground water.[2] In 1990, Carson City served about 6,500 acre-feet from ground water and 3,000 acre-feet from surface water. Water from the system originally constructed to serve the Comstock mines (the Marlette Lake/Hobart Creek Reservoir system) also supplies the area. This system has gone through several ownership changes throughout its history; the State of Nevada acquired part of the system to supply its facilities in Carson City, and water from this source has, at times, been purchased for local municipal supply. This system also continues to supply water to the Virginia City area. Only a portion of the system's full export capacity has been used in recent years.

1 The Geological Survey reported extractions in 1985 for municipal use of about 4,000 acre-feet in its report cited in Appendix 3.

2 The Carson River does not flow through Eagle Valley, where Carson City is located; hence the diversions from its tributaries.

The relatively rapid growth experienced in Carson and Eagle valleys and the Dayton corridor along U.S. Highway 50 has created an interest in planning for future municipal supplies in this area. The Nevada Legislature called for a study of the Carson River in 1985, and specifically for evaluation of possible reservoir projects in the upper watershed. This mandate was, in part, a reaction to the apparent lack of success in pursuing construction of Watasheamu Reservoir.

The proposed Bodie Creek dam and reservoir, to be located entirely in Nevada, was a project recommended for further analysis as a result of this study. The proposed reservoir would probably not develop new water supply but was envisioned for storage of existing water rights, particularly agricultural rights acquired for conversion to municipal use. The proposed reservoir could also provide flood control benefits; there is currently no significant regulation of flow in the upper watershed, leaving the rapidly developing communities downstream in Nevada with little structural protection against floods.[1] Further studies of water supply possibilities associated with the Bodie Creek site are being considered by the local governmental agencies that might participate in such a project.



A reach of the Carson River near Dayton has been proposed for inclusion in the federal Superfund program because of past contamination from mining activities.

The small water systems serving communities downstream from Carson City and above Fallon rely primarily on ground water for their supply, as does Fallon itself. Fallon's main municipal supply and the supply for Fallon Naval Air Station come from a basalt aquifer in the Lahontan Valley; individual water users in that area rely on shallow alluvial aquifers. Portions of this alluvial aquifer system are recharged by Newlands Project water supply, leading to local concerns that water rights purchases on lands irrigated by the project or major changes in project operation could affect local water

1 The upper alpine reservoirs in California do not provide any significant river regulation from a flood control standpoint. They are too small and are not operated to provide flood regulation.

supplies. The settlement legislation specifies that impacts on local water supply be considered as part of the project-related activities called for in the act.

Ground water supply in the Carson Sink area is constrained in some locations by water quality, as would be expected given the concentration of evaporite minerals typical of a sink. Water quality is also influenced by the regional geothermal activity, with arsenic being a particular problem. The Naval Air Station recently evaluated some interesting technologies for its water treatment plant so it could remove the arsenic associated with extractions from the basalt aquifer. The recent reauthorization of the Newlands Project to expand its functions to include municipal supply for Lyon and Churchill counties (including the Fallon Indian Reservation) offers the prospect of perhaps simplifying some treatment needs, if surface water were to someday be available for blending purposes.[1]

The demonstrated reliance on ground water in the Carson basin accords well with the treatment preferences associated with the 1986 amendments to the federal Safe Drinking Water Act. New requirements resulting from the amendments make filtration of most surface water supplies mandatory, with certain exceptions. These filtration requirements are not applied to most ground water supplies, because they are typically less prone to the microbiological contamination often found in surface water. Small communities with a limited rate-payer base are, thus, tending to favor ground water, where available, for new or expanded supplies, because the treatment costs can be less.

Hydroelectric Power Generation

In contrast to the early Comstock years, when a number of pelton wheels were in operation, the only locations in the watershed where hydroelectric power is generated today are the two power plants on the Newlands Project. A powerplant was installed at Lahontan Dam in 1915 as part of the initial project facilities; it has a capacity of 1.92 megawatts. Truckee-Carson Irrigation District subsequently constructed its own small plant on the V-Canal, downstream of the dam, to take

The Dawn of Electric Light

Today we take the benefits of electricity for granted. Earlier generations were not so privileged. In the frontier towns, the advent of electric power was greeted with great enthusiasm (as well as some trepidation by the less technologically inclined). Electric lighting replaced the gas lights used for street and some home illumination and replaced the more humble kerosine lamps and candles found in most homes. Electric lighting for the mills and businesses of Virginia City arrived as early as 1888, according to Hugh Shamberger's Water Supply for the Comstock, courtesy of the local water-powered pelton wheels used by the mills. Electricity for homes arrived around 1900, when power was brought in from hydroplants on the Truckee River. The Territorial Enterprise editorialized on Virginia City's luminous future in a December 2, 1887, article quoted in Shamberger's book:

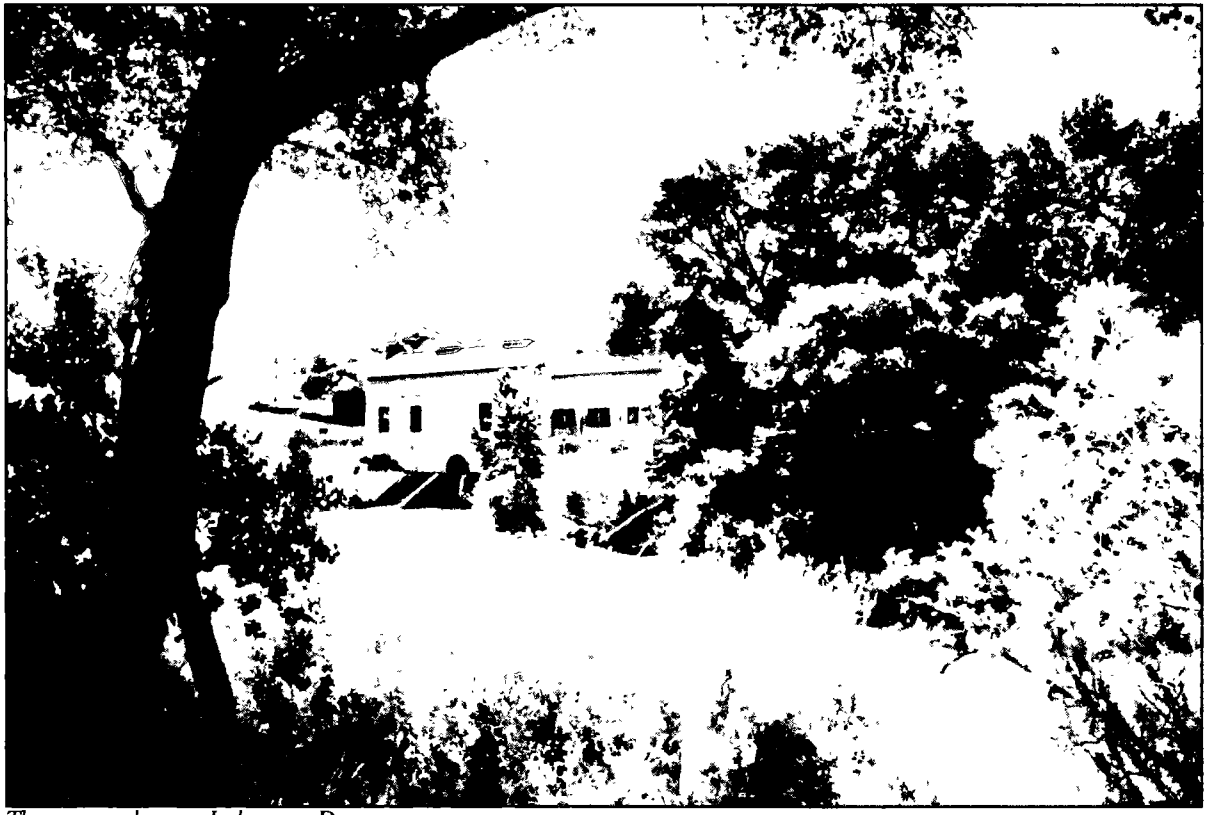
> *"Our light is no longer 'hidden under a bushel' in this city set upon a hill. It blazes forth to the illumination of all, and is the light that flashed down from the heavens long before man was on earth. It is the light that always will be, and can never be improved on."*

1 The tiny community of Hazen, adjacent to the Truckee Canal, has historically received a small surface water supply from the Newlands Project. Hazen has been the project's only domestic water user.

advantage of a 26-foot drop in canal elevation. These plants provided the first electricity to the rural area around Fallon and were later to engender controversy over their operation.

In early years, the Newlands Project was sometimes operated specifically for hydropower generation, meaning water was diverted into the Truckee Canal or released from Lahontan Reservoir solely to power the turbines, without being used for irrigation. While this operation did, at least, provide some water to the wetlands downstream, it also exacerbated the decline of Pyramid Lake levels. This practice of operation for power only was terminated in about 1967; power production now is incidental to project operation for authorized purposes such as irrigation. Since Fallon and the surrounding rural area have been tied into the regional power grid operated by Sierra Pacific Power Company, the project's hydroplants are no longer the only power supply for the area.

Many potential hydropower plant sites have been studied in the upper reaches of the watershed in California, where the steep drops in elevation on the mainstem river and on some of its tributaries make power production a possibility. In fact, nonconsumptive hydropower rights are listed in the Alpine Decree for the upper watershed area, although these rights have not been exercised. In recent years, several filings have been made with the Federal Energy Regulatory Commission for potential sites on the East Fork or its tributaries, but none of these has proceeded to the construction phase.



The powerplant at Lahontan Dam.

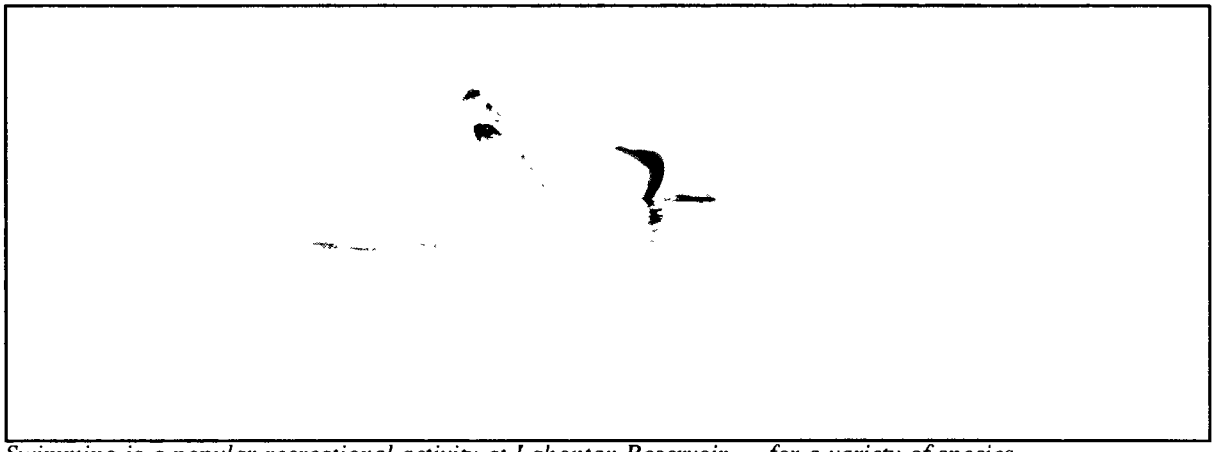
Fish and Wildlife Water Use

Water is a component of the region's ecosystem and supports habitat used by a variety of species. The habitat provided can take the form of wetlands and riparian areas or stream and lake environments. In analyzing fish and wildlife water uses, emphasis is usually placed on water-dwelling species, such as fish, or species, such as waterfowl, whose existence is greatly dependent on availability of large expanses of water. Most land mammals consume very small amounts of water compared to that needed to support the habitat required by aquatic species.

The Carson River supports a popular recreational trout fishery in the upper watershed in California. Although the East Fork is heavily stocked with hatchery trout by the California Department of Fish and Game, some segments have been designated as wild trout waters, which are not stocked and where special fishing regulations apply. Fish and Game has used Heenan Lake, on Monitor Creek tributary to the East Fork, for raising Lahontan cutthroat trout to stock in other locations throughout the Sierras. Fish and Game currently manages some state-owned land adjacent to Heenan Lake and has arranged to purchase water on an annual basis to maintain a minimum reservoir pool. Private conservation interests have been negotiating the purchase of water rights in the reservoir to provide a permanent minimum pool for fish.

Most of the attention on quantifying fish and wildlife water needs in the basin has focused on the Lahontan Valley wetlands at the other end of the river, especially on Stillwater and Carson Lake Pasture, the two largest remaining wetlands. Today's avian users of the wetlands include ducks (redhead, gadwall, shoveler, canvasback, and cinnamon teal), Canada and snow geese, tundra and whistling swans, grebes, egrets, white-faced ibis, bald eagles, long-billed dowitchers, gulls, American avocets, western snowy plovers, and American white pelicans. The pelicans actually nest at Anaho Island National Wildlife Refuge in Pyramid Lake and commute daily to Stillwater (a one-way distance of about 60 miles) to feed in the shallow water. Parts of the wetlands are or have been managed for waterfowl hunting and muskrat trapping.

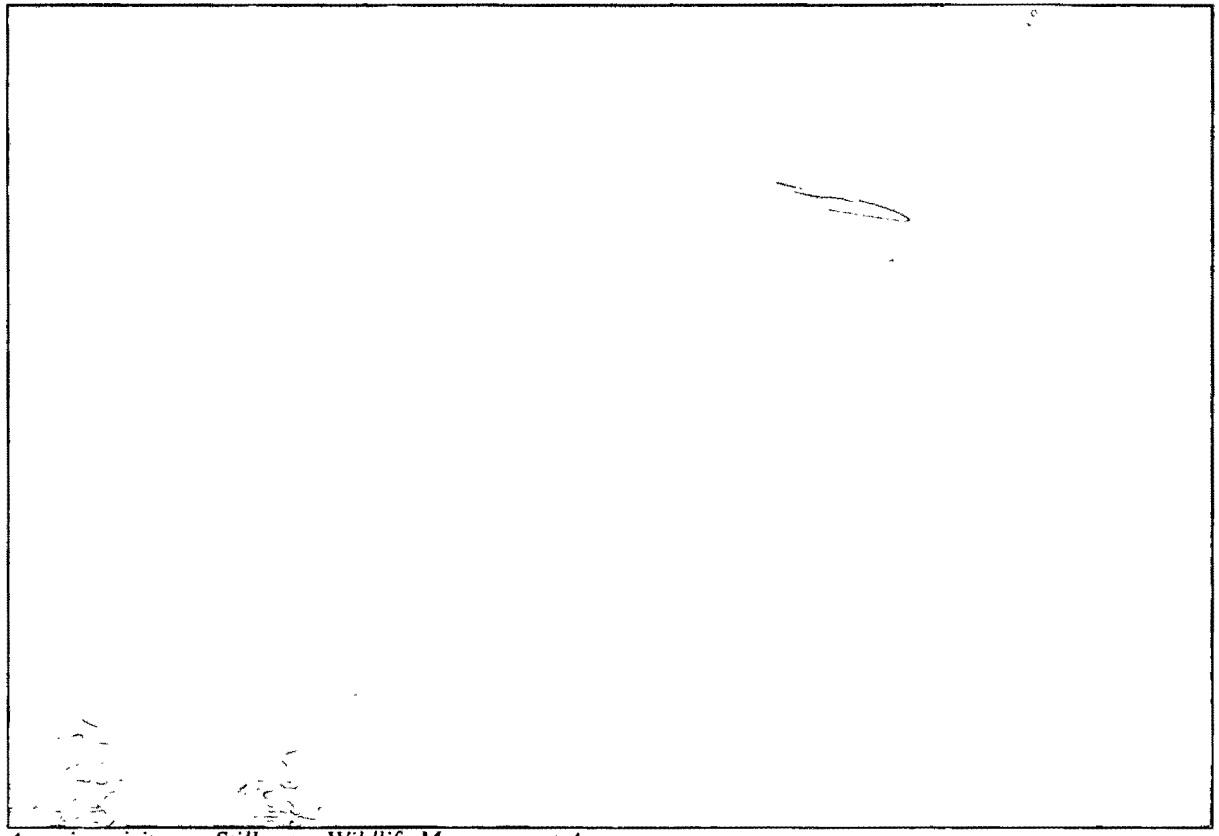
Prior to development in the valley, the area's large expanses of open water and marsh habitat hosted countless migratory birds on the Pacific Flyway. Wetlands that were not converted to agricultural land still remained relatively productive in the Newlands Project's early years, because of fresh water supplied by Lahontan Reservoir spills and operation for hydropower generation. Wetlands acreage began a precipitous decline when the Pyramid Lake cui-ui were listed as an endangered species and the project was required to minimize its diversion of Truckee River water and cease operating solely for hydropower production. Agricultural drain water and tailwater became the primary water supply for the wetlands, resulting in water quality concerns.



Swimming is a popular recreational activity at Lahontan Reservoir —for a variety of species.

In recent years this reduction in water supply, combined with a drought, further affected the wetlands. The U.S. Fish and Wildlife Service estimated that wetlands acreage at Stillwater was about 6,500 acres in 1989, out of the 200,000 acres (less private in-holdings) in the wildlife management area.[1] Carson Lake Pasture supported about 2,500 acres of wetlands in 1989, out of an average pre-1970s figure of about 13,000 acres. (The pre-project size of the Carson Lake Pasture wetlands is estimated at about 25,000 acres.)

Water quality problems associated with the wetlands include high levels of mercury in sediments, induced into the river upstream during the Comstock boom. A health advisory has been issued on eating shoveler ducks from Carson Lake Pasture because these bottom-feeding ducks may contain elevated mercury concentrations. Evaluations have also been made of the agricultural drain water



An avian visitor at Stillwater Wildlife Management Area.

Managed Wetlands

Both the U.S. Fish and Wildlife Service and the Nevada Department of Wildlife manage wetlands units in the Lahontan Valley. In a natural wetlands area, before human intervention in the ecosystem, the presence or absence of water dictates the form of the area. Thus, in wetter years there might be a large expanse of open water, with less marshy land with plant cover, and in dryer years the situation might be reversed. A typical managed wetlands is very different, resembling more a type of farming intended to grow areas of different habitat types. A system of dikes and canals is constructed, dividing the area into management units. Some units are designed for primarily open-water conditions; others are planted with grains or grasses to provide cover and food for the targeted species. In sinks such as Lahontan Valley, where evaporation causes concentration of salts, units are also managed according to salinity of the water supply. Some units are devoted to vegetation that is salt tolerant; ultimately, water that is too saline for further use will be disposed of in evaporation ponds.

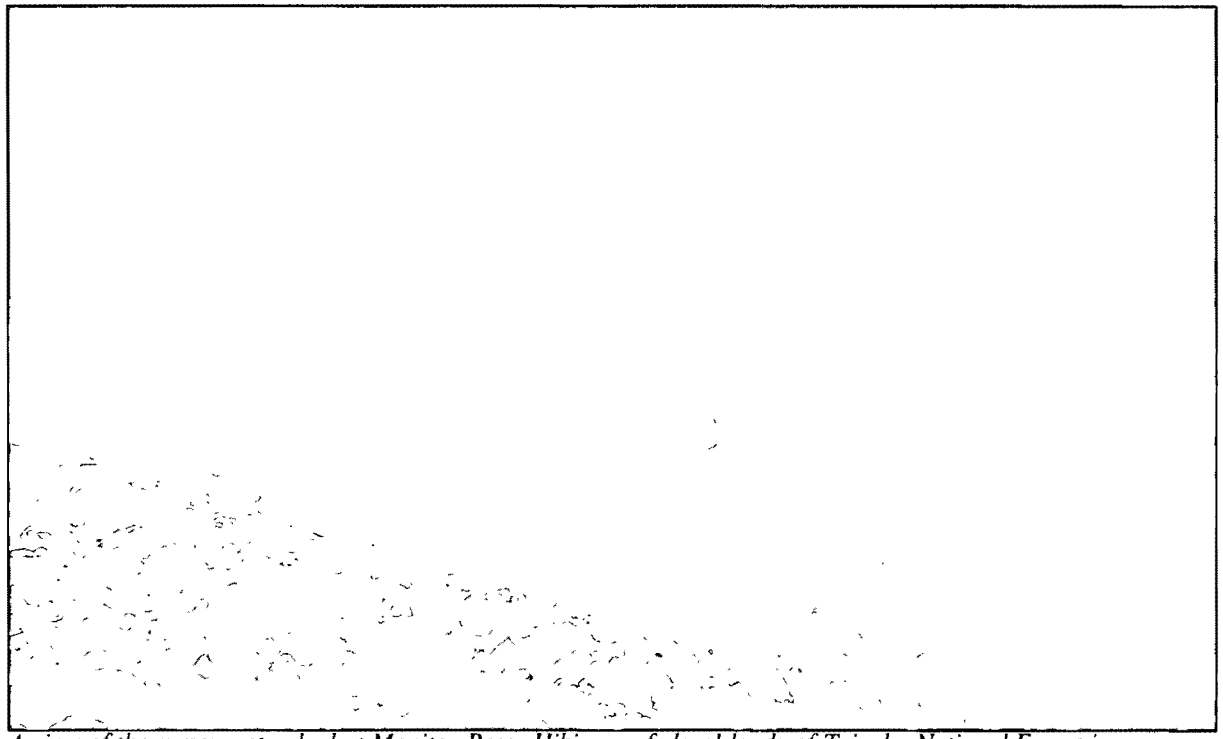
1 The wildlife refuge area within the management area comprised 24,000 acres when established in 1948. The settlement act calls for the management of about 77,520 acres of federal land as a refuge. Altogether, there is the potential to manage about 23,000 acres of primary wetlands.

entering Stillwater, where elevated levels of arsenic, boron, selenium, lithium, and molybdenum have been detected. The Hunter and T-J drains, in particular, have been pinpointed as contributors of elevated levels of contaminants. Part of the problem may be that the drains are intercepting mineralized ground water associated with the nearby geothermal areas. The settlement act directs the Secretary of Interior to develop and implement a plan for closure of the T-J Drain in coordination with the Fallon Paiute-Shoshone Tribe, whose reservation is served by the drain.

Purchase of water rights for the wetlands called for in the settlement act is targeted to sustain about 25,000 acres of primary wetlands habitat in Lahontan Valley. About 50,000 to 60,000 acre-feet of water rights are expected to be purchased. These rights and the existing drainage water supply would be used for the managed wetlands. The water rights are to be purchased from willing sellers and can be conveyed to the wetlands by the Newlands Project distribution system. As a practical matter, lands considered for water rights purchases include those whose rights can most easily be delivered to the wetlands without disrupting other irrigators' operations and those having the highest duties of water. Lands suspected of causing a high contaminant loading to the wildlife area could also be good candidates for acquisition.

Recreational Water Use

The upper part of the Carson River watershed is well known for its scenic values and hiking opportunities. The small alpine lakes on Forest Service lands provide destinations for day hikes or back-packing trips. Hope Valley, on the West Fork Carson River, is popular for easy hikes and cross-country skiing. The Pacific Crest Trail traverses the highest elevation part of the watershed, with a convenient trail head access point at Ebbetts Pass on State Highway 4. Since most of the upper watershed is publicly owned land managed by the Forest Service, there are many opportunities for recreational access and several developed campgrounds. Trout fishing is a prized pastime, especially on the East Fork and some of its tributaries. Rafting is possible on the East Fork during the spring snowmelt period when high flows are available in normal to wet years. Rafters put in the river near Markleeville and float downstream to the margin of the Carson Valley in Nevada.



A view of the upper watershed at Monitor Pass. Hiking on federal lands of Toiyabe National Forest is a popular summer activity.

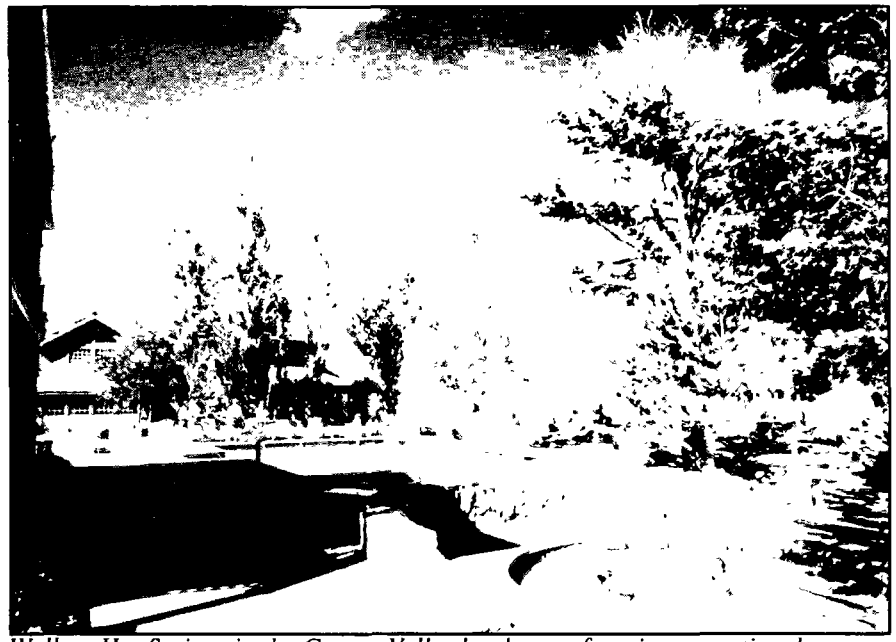
Hot springs form another important component of water-based recreation in the upper and middle watersheds. Two hot springs have been developed to attract visitors: Grover Hot Springs State Park and Walleys Hot Springs. Several undeveloped hot springs are located on public lands accessible to hikers or off-road vehicles. As noted in the sidebar below, Warm Springs, near Carson City, is accessible to only a few.

Recreation in the middle watershed focuses on the area's historic past. Virginia City, Gold Hill, Silver City, and Dayton offer visitors a glimpse of what life was like in the period of early settlement. It is possible to hike the Carson River Canyon (parts of which are accessible to off-road vehicles) below Empire, on the outskirts of Carson City, downstream to Dayton. In this reach, many remains of the historic Comstock days may be seen — old railroad grades and cuts, former mill sites (almost nothing is left of most of the mills) and mill dam sites, and the remains of one mill in Brunswick Canyon. Dayton State Park is located on the river at Dayton, at the site of the former Rocky Point quartz mill, originally constructed in 1861. An unpaved road parallels the river from Dayton to Fort Churchill State Monument, where the old fort buildings are maintained in a state of arrested decay.

Taking the Waters

In the late 1800s and early 1900s, taking the waters at hot springs resorts was a popular recreational endeavor. Dan DeQuille provides us with a description of one such resort in the Carson River watershed, Warm Springs near Carson City, which was subsequently acquired by the State of Nevada in its purchase of land for a prison.

> *"About a mile east of Carson City, at the Nevada State prison, is a warm spring of great volume. Here Col. Abe Curry, who owned the property before it was acquired by the State, constructed the first swimming bath to be found on the Pacific Coast. It is 160 feet long by 38 feet wide, and is walled up with stone, and over it is erected a building, also of stone, of which there is a fine quarry on the spot. The water in the pool is from three to five feet deep, and is of about blood heat. This bath is not now open to the 'world at large,' but is kept for a little world that is 'not at large.'"*

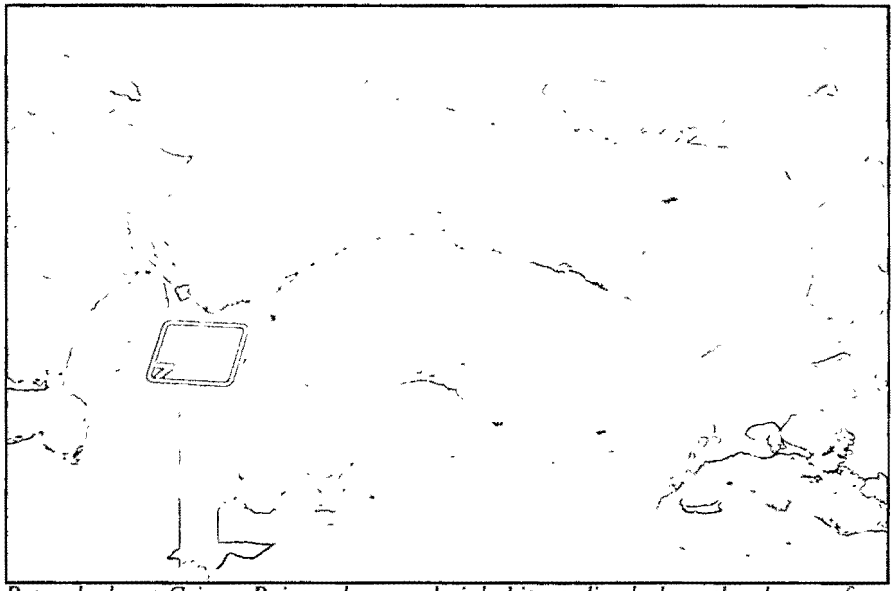


Walleys Hot Springs in the Carson Valley has been a favorite recreational destination for more than a hundred years. Early visitors ascribed curative powers to the thermal springs, which were said to be efficaceous in the treatment of rheumatism.

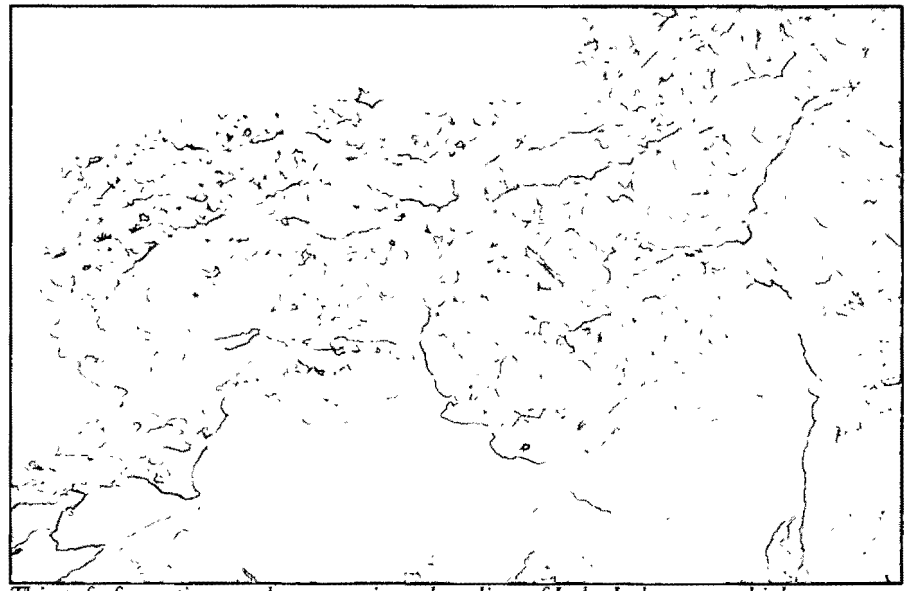
Lahontan Reservoir, one of the few large reservoirs entirely within Nevada, is a major attraction for local residents. Facilities, operated by the Nevada state park system, include a marina, boat ramps, day-use areas, and campgrounds. The reservoir has been noted for its warmwater fishery and is a popular spot for boaters, including water-skiers and jet-skiers.

Hunting, fishing, and wildlife observation are featured at the Lahontan Valley wetlands, especially at Stillwater Wildlife Management Area. Most fishing is in the Indian Lakes area of Stillwater, where warmwater species can be found. Developed facilities are primarily limited to the road system and parking areas, although there are wildlife observation towers at the Carson Lake Pasture. The pasture also supports some hunting, and some private gun clubs are located adjacent to federally owned wetlands at both Stillwater and the pasture. Recreational activities at the wetlands can be highly dependent on annual water supply conditions.

The "drylands" in the Carson Sink offer their own recreational opportunities. The Bureau of Land Management has developed an interpretive area at Grimes Point, on the sink's eastern edge (shown on Figure 5), where archaeologists have found extensive traces of prehistoric inhabitants. There is a petroglyph trail and a trail to the Hidden Cave area, a cluster of caves where early hunter-gatherers lived or stored their supplies. This cave complex overlooks the shores of what was then Lake Lahontan; its former shorelines are evident on the surrounding hillsides and in the tufa deposits of calcium carbonate left behind by algae in the lake. Intricate draperies of tufa have been left behind on the volcanic rocks where the water once lapped; these, together with other oddly-shaped tufa remains, are part of the Sehoo and Eetza formations, named for the adjoining mountains. The former lake is believed to have provided food for the early inhabitants whose traces remain, much as the Stillwater marshes more recently provided sustenance for the Indians residing there.



Petroglyphs at Grimes Point, where early inhabitants lived along the shores of the then-extant Lake Lahontan.



This tufa formation marks a one-time shoreline of Lake Lahontan, which once covered much of the Carson Sink.

Chapter 7

FUTURE DIRECTIONS

This last chapter briefly recaps several subjects expected to be of continued interest in the Carson River watershed over the next decade. Many of these items will come about in response to recent passage of the Truckee-Carson-Pyramid Lake Water Rights Settlement Act.

One trend that applies throughout the watershed is an increasing use of water transfers or plans to use water transfers to meet new needs, rather than developing new sources of supply. This trend comes, in part, from the belief there is no new water to develop on the Carson River; the Alpine Decree contains an often-quoted statement that: "...the waters of the Carson River and its tributaries are fully appropriated."[1] To some extent, water transfers have been more frequently employed on the eastern side of the Sierras, especially in Nevada, than they have on the western side, simply because there is relatively little surface water available on the arid eastern slope. A number of communities in northern Nevada are planning to meet part of their future water needs by acquiring agricultural water rights for conversion to municipal use. Agricultural rights are also being purchased to support environmental uses.

Preserving instream beneficial uses of water is increasingly more important in water management decisions.

1 Strictly speaking, this has not been true from the State of California's perspective, because the Alpine Decree only adjudicated rights among the parties to the decree; it was not an adjudication of all the rights on the river. The settlement legislation recognizes that there are some perfected rights obtained under state law in both California and Nevada which were not included in the decree.

The Upper Watershed in California

Major changes in land use are not expected in the upper watershed, given the area's large percentage of federal landholdings and historically stable population. The present trend of acquiring land and water resources for transfer to public ownership will probably continue as conservation groups continue their efforts to preserve open space and provide for wildlife habitat. There is an ongoing interest in purchasing water rights in the high alpine reservoirs to maintain lake levels or support instream flows for fish.

The eventual implementation of the interstate allocations set forth in the settlement legislation is not expected to significantly affect water use patterns in existence today, since the allocations were largely based on existing uses. The allocations will not take effect until several contingencies contained in the legislation are met, including dismissal of certain litigation, negotiation of an operating agreement for the Truckee River, and federal payment of specified funds to settle Indian water rights claims. It appears that the earliest possible effective date for the allocations is 1997.

California's Public Trust Doctrine

One example of changes in water allocation policies with changing social values lies in application of the public trust doctrine in California. A well-known 1983 State Supreme Court decision, National Audubon Society v. Superior Court, covered the application of public trust concepts to water rights administered by the State Water Resources Control Board. These concepts include balancing public trust uses of water (e.g., instream flows) against typical consumptive uses of water during the water rights application process. Additionally, the state retains continuing control over use of appropriated water and may reconsider the effect of past allocation decisions on public trust uses. This doctrine is now being used in many administrative and court water rights actions in California. One example is the recent series of court cases surrounding Mono Lake.

The Carson Valley

U.S. Geological Survey studies in the valley as part of its national water quality assessment program will provide local water users with a better understanding of the available ground water resources and will assist them in considering management options for the ground water basin. This basin is the most promising location for significant use of ground water in the Carson River watershed and is expected to be an increasingly important water source for municipal users. The basin also offers the opportunity for conjunctive use of surface and ground water,[1] especially in the more distant future as municipal demands increase. The settlement legislation explicitly provides that conjunctive use studies may be performed. Conjunctive use is an increasingly popular water management tool in California, but is less common in Nevada due to the relative paucity of surface water supplies.

1 Conjunctive use of ground and surface water usually entails storing excess water in wet years in a ground water basin where storage capacity is available, and extracting that water in dry years when surface supplies are deficient.

The Carson Sink

The settlement act's many provisions concerning the Newlands Project and the Lahontan Valley wetlands foreshadow the potential for a wide range of activities pertaining to the Carson Sink. The legislation requires the federal government to take several actions regarding the project:

» Performing a study on improving the project's average conveyance efficiency to 75 percent,

» Enforcing compliance with OCAP requirements on amounts of Truckee River water diverted to the project, and

» Pursuing recoupment of excess water diverted in the past in violation of the OCAP. (This water would be used to meet the government's responsibilities under the Endangered Species Act for listed fish in Pyramid Lake.)

As to the wetlands, the government is directed to study the feasibility of using reclaimed municipal waste water as a supply for the wetlands and is directed to acquire freshwater rights for the wetlands. Studies to remedy wetlands water quality problems associated with agricultural drain water are authorized; the T-J Drain is to be closed. Federally owned lands at Carson Lake Pasture and Indian Lakes are to be transferred to state or local governments for wildlife management, and a demonstration project for water-conserving plantings is to be implemented at Fallon Naval Air Station. The government is additionally authorized to use Newlands Project facilities to provide a water bank for holders of valid rights and is authorized to study improving the recreational benefits associated with Lahontan Reservoir.

The rapidly vanishing Lahontan Valley wetlands stand to receive important gains from the settlement act provisions. Some private parties have already acquired water rights for the wetlands, and the federal government will be preparing environmental documentation for its purchases of water rights in the near future. Obtaining additional water supply for the wetlands is especially important at this time because of the added stress to the area created by the drought of the late 1980s and early 1990s.

Reauthorization of the Newlands Project to serve additional uses such as municipal, fish and wildlife, and recreational uses, has the potential to benefit many local interests, including those whose economic livelihood is associated with tourism and commerce. Use of surface water to augment municipal supplies could help resolve water quality difficulties associated with the local ground water supply.

Wildlife in the Lahontan Valley wetlands will benefit from the water rights acquisition program.

APPENDIXES

PUBLIC LAW 101-618

An Act to provide for the settlement of water rights claims of the Fallon Paiute Shoshone Indian Tribes and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

TITLE -- FALLON PAIUTE SHOSHONE TRIBAL SETTLEMENT ACT

SEC 101 SHORT TITLE

This Act may be cited as the "Fallon Paiute Shoshone Indian Tribes Water Rights Settlement Act of 1990"

SEC. 102 SETTLEMENT FUND

(A) There is hereby established within the Treasury of the United States, the "Fallon Paiute Shoshone Tribal Settlement Fund", hereinafter referred to in the Act as the "Fund"

(B) There is authorized to be appropriated to the Fallon Paiute Shoshone Tribal Settlement Fund $3,000,000 in fiscal year 1992, and $8,000,000 in each year for fiscal years 1993, 1994, 1995, 1996, and 1997 for a total sum of $43,000,000

(C)(1) The income of the Fund may be obligated and expended only for the following purposes:

(a) Tribal economic development, including development of long-term profit-making opportunities for the Fallon Paiute Shoshone Tribes (hereinafter referred to in the Act as "Tribes") and its tribal members, and the development of employment opportunities for tribal members,

(b) Tribal governmental services and facilities;

(c) Per capita distributions to tribal members,

(d) Rehabilitation and betterment of the irrigation system on the Fallon Paiute Shoshone Indian Reservation (hereinafter referred to in the Act as "Reservation") not including lands added to the Reservation pursuant to the provisions of Public Law 95-337, 92 Stat 455;

(e) Acquisition of lands, water rights or related property interests located outside the Reservation from willing sellers, and improvement of such lands,

(f) Acquisition of individually-owned land, water rights or related property interests on the Reservation from willing sellers, including those held in trust by the United States

(2) Except as provided in subsection (C)(3) of this section, the principal of the Fund shall not be obligated or expended

(3) In obligating and expending funds for the purposes set forth in subsections (C)(1)(d), (C)(1)(e) and (C)(1)(f) of this section, the Tribes may obligate and expend no more than 20 percent of the principal of the Fund, provided that any amounts so obligated and expended from principal must be restored to the principal from repayments of such amounts expended for the purposes identified in this subsection, or from income earned on the remaining principal

(4) In obligating and expending funds for the purpose set forth in subsection (C)(1)(c), no more than twenty percent of the annual income from the Fund may be obligated or expended for the purpose of providing per capita payments to tribal members

(D) The Tribes shall invest, manage, and use the monies appropriated to the Fund for the purposes set forth in this section in accordance with the plan developed in consultation with the Secretary under subsection (F) of this section.

(E) Upon the request of the Tribes, the Secretary shall invest the sums deposited in, accruing to, and remaining in the Fund, in interest-bearing deposits and securities in accordance with the Act of June 24, 1938, 52 Stat. 1037, 25 U.S C 162a, as amended All income earned on such investments shall be added to the Fund.

(F)(1) The Tribes shall develop a plan, in consultation with the Secretary, for the investment, management, administration and expenditure of the monies in the Fund, and shall submit the plan to the Secretary. The plan shall set forth the manner in which such monies will be managed, administered and expended for the purposes outlined in subsection (C)(1) of this section. Such plan may be revised and updated by the Tribes in consultation with the Secretary.

(2) The plan shall include a description of a project for the rehabilitation and betterment of the existing irrigation system on the Reservation. The rehabilitation and betterment project shall include measures to increase the efficiency of irrigation deliveries. The Secretary may assist in the development of the rehabilitation and betterment project, and the Tribes shall use their best efforts to implement the project within four years of the time when appropriations authorized in subsection (B) of this section become available

(3) Upon the request of the Tribes, the Secretary of the Treasury and the Secretary of the Interior shall make available to the Tribes, monies from the Fund to serve any of the purposes set forth in subsection (C)(1) of this section, except that no disbursement shall be made to the Tribes unless and until they adopt the plan required under this section.

(G) The provisions of section 7 of Public Law 93-134, 87 Stat 468, as amended by section 4 of Public Law 97-458, 96 Stat 2513, 25 U S C. 1407, shall apply to any funds which may be distributed per capita under subsection (C)(1)(c) of this section

SEC 103 ACQUISITION AND USE OF LANDS AND WATER RIGHTS

(A) Title to all lands, water rights and related property interests acquired under section 102(C)(1)(e) within the counties of Churchill and Lyon in the State of Nevada, shall be held in trust by the United States for the Tribes as part of the Reservation, provided that no more than 2,415.3 acres of such acquired lands and no more than 8,453 55 acre feet per

year of such water rights shall be held in trust by the United States and become part of the Reservation under this subsection

(B) Any lands acquired under section 102(C)(1)(e) or (f) shall be subject to the provisions of section 20 of the Act of October 17, 1988, 102 Stat 2485

(C)(1) Total annual use of water rights appurtenant to the Reservation which are served by the Newlands Reclamation Project, including Newlands Reclamation Project water rights added to the Reservation under subsection (A) of this section, whether used on the Reservation or transferred and used off the Reservation pursuant to applicable law, shall not exceed the sum of

(a) 10,587 5 acre feet of water per year, which is the quantum of water rights served by the Newlands Reclamation Project appurtenant to the Fallon Paiute Shoshone Indian Reservation lands that are currently served by irrigation facilities, and

(b) the quantum of active Newlands Reclamation Project water rights currently located outside of the Reservation that may be added to the Reservation or water rights which are acquired by the Secretary and exercised to benefit Reservation wetlands.

(2) The requirements of section 103(C)(1) shall not take effect until the Tribes agree to the limitations on annual use of water rights set forth in subsection (1) of this section

(D) The Secretary is authorized and directed to reimburse non-Federal entities for reasonable and customary costs for delivery of Newlands Reclamation Project water to serve water rights added to the Reservation under subsection (A) of this section, and to enter into renewable contracts for the payment of such costs, for a term not exceeding forty years

(E) Subject to the limitation on the quantum of use set forth in subsection (C) of this section, and applicable state law, all water rights appurtenant to the Reservation that are served by the Newlands Reclamation Project, including Newlands Reclamation Project water rights added to the Reservation under subsection (A) of this section, may be used for irrigation, fish and wildlife, municipal and industrial, recreation, or water quality purposes, or for any other beneficial use subject to applicable laws of the State of Nevada Nothing in this subsection is intended to affect the jurisdiction of the Tribes or the State of Nevada, if any, over the use and transfer of water rights within the Reservation or off the Reservation, or to create any express or implied Federal reserved water right

(F)(1) The Tribes are authorized to acquire by purchase, by exchange of lands or water rights, or interests therein, including those held in trust for the Tribes, or by gift, any lands or water rights, or interests therein, including those held in trust, located within the Reservation, for any of the following purposes

(a) Consolidating Reservation landholdings or water rights, including those held in trust,

(b) Eliminating fractionated heirship interests in Reservation lands or water rights, including those held in trust;

(c) Providing land or water rights for any tribal program,

(d) Improving the economy of the Tribes and the economic status of tribal members through the development of industry, recreational facilities, housing projects, or other means, and

(e) General rehabilitation and enhancement of the total resource potential of the Reservation Provided, That any water rights shall be transferred in compliance with applicable state law

(2) Title to any lands or water rights, or interests therein, acquired by the Tribes within the counties of Churchill and Lyon in the State of Nevada under the authority of this subsection shall be held by the United States in trust for the Tribes

SEC 104 RELEASE OF CLAIMS

(A)(1) The Secretary of the Treasury and the Secretary of the Interior shall not disburse any monies from the Fund until such time as the following conditions have been met--

(a) the Tribes have released any and all claims they may have against the United States resulting from any failure of the United States to comply with section 7 of Public Law 95-337, 92 Stat 457,

(b) the Tribes have dismissed with prejudice their claims in *Northern Paiute Nation* v *United States*, Docket No 87-A, United States Claims Court;

(c) the Tribes have agreed to accept and abide by the limitation on use of water rights served by the Newlands Reclamation Project on the Reservation, as set forth in section 103(C),

(d) the Tribes have dismissed, without prejudice, their claims in *Pyramid Lake Paiute Tribe of Indians* v. *Lujan*, No R-85-197 (D Nev) and their objections to the Operating Criteria and Procedures for the Newlands Reclamation Project adopted by the Secretary on April 15, 1988, provided that such dismissal shall not prejudice in any respect the Tribes' right to object in any administrative or judicial proceeding to such Operating Criteria and Procedures, or any revisions thereto, or to assert that any Operating Criteria and Procedures should be changed due to new information, changes in environmental circumstance, changes in project descriptions or other relevant considerations, in accordance with the requirements of all applicable court decrees and applicable statutory requirements;

(e) the Tribes agree to be bound by a plan developed and implemented by the Secretary in accordance with section 106 of this title, and

(f)(1) the Tribes agree to indemnify the United States against monetary claims by any landowners who may hold water rights on the Reservation as of the date of enactment of the Act and who may assert that the provisions of section 103(C) of this title effect an unlawful taking of their rights: Provided, That--

(i) the United States shall defend and resist any such claims at its own expense,

(ii) the Tribes shall be entitled to intervene in any administrative or judicial proceeding on such claims, and

(iii) the United States shall not compromise or settle any such claims without the consent of the Tribes.

(2) The provisions of this section shall not be construed as.

(i) implying that section 103(C) unlawfully takes any water rights;

(ii) conferring jurisdiction on any court or other tribunal to adjudicate any such taking claims,

(iii) waiving any immunities of the United States or the Tribes, or

(iv) otherwise establishing or enhancing any claims to water rights or for the unlawful taking of such rights

(2) If the appropriations authorized in section 102(B) are not appropriated by the Congress, it shall be deemed that the conditions set forth in this Act have not been satisfied, and the Tribes may rescind their release of claims under this section and its agreement under subsection (c) of this section (3) Upon the appropriation of monies authorized in

section 102(B) of this Act, and the allocation of such monies to the Fund, section 7 of Public Law 95-337, 92 Stat. 457, shall be repealed

SEC 105. LIABILITY OF THE UNITED STATES.

(A) Except with regard to the responsibilities assumed by the United States under section 102(E), and those set forth in section 1301 of the Act of February 12, 1929, 45 Stat. 1164, as amended, 25 U S C 161a, the United States shall not bear any obligation or liability regarding the investment, management, or use of funds by the Tribes

(B) Except with regard to the responsibilities assumed by the United States under section 102(B), section 102(F)(3), section 103(A), section 103(D), section 103(F)(2), section 104(A)(1), and section 106, the United States shall not bear any obligation or liability for the implementation of the provisions of this Act.

SEC 106. PLAN FOR THE CLOSURE OF TJ DRAIN.

(A) The Secretary, in consultation with the Tribes and in accordance with applicable law, shall develop and implement a plan for the closure, including if appropriate, modification of components, of the TJ drain system, including the main TJ drain, the TJ-1 drain and the A drain and its sublaterals, in order to address any significant environmental problems with that system and its closure

(B) The plan shall include measures to provide necessary substitute drainage in accordance with Bureau of Reclamation standards for reservation lands in agricultural production as of the 1990 irrigation season that are served by that system, unless the Tribes and the Secretary agree otherwise.

(C) Implementation of the plan shall not interfere with ongoing agricultural operations.

(D) The United States shall bear all costs for developing and implementing the plan

(E) There is authorized to be appropriated such sums as may be necessary to carry out the provisions of this section.

SEC 107 DEFINITIONS

For purposes of this title, and for no other purposes--

(A) the term "Fallon Paiute Shoshone Tribal Settlement Fund" or "Fund" means the Fund established under section 102(A) of this Act to enable the Fallon Paiute Shoshone Tribes to carry out the purposes set forth in section 102(C)(1) of this title,

(B) the term "income" means all interest, dividends, gains and other earnings resulting from the investment of the principal of the Fallon Paiute Shoshone Tribal Settlement Fund, and the earnings resulting from the investment of such income,

(C) the term "principal" means the total sum of monies appropriated to the Fallon Paiute Shoshone Tribal Settlement Fund under section 102(B) of this Act,

(D) the term "Reservation" means the lands set aside for the benefit of the Fallon Paiute Shoshone Tribes by the orders of the Department of the Interior of April 20, 1907, and November 21, 1917, as expanded and confirmed by the Act of August 4, 1978, Public Law 95-337, 92 Stat. 457,

(E) the term "Secretary" means the Secretary of the Department of the Interior,

(F) the term "tribal members" means the enrolled members of the Fallon Paiute Shoshone Tribes; and

(G) the term "Tribe" means the Fallon Paiute-Shoshone Tribe.

TITLE II--TRUCKEE-CARSON-PYRAMID LAKE WATER SETTLEMENT

SEC 201. SHORT TITLE.

This title may be cited as the "Truckee-Carson-Pyramid Lake Water Rights Settlement Act"

SEC. 202 PURPOSES.

The purposes of this title shall be to--

(a) provide for the equitable apportionment of the waters of the Truckee River, Carson River, and Lake Tahoe between the State of California and the State of Nevada,

(b) authorize modifications to the purposes and operation of certain Federal Reclamation project facilities to provide benefits to fish and wildlife, municipal, industrial, and irrigation users, and recreation;

(c) authorize acquisition of water rights for fish and wildlife,

(d) encourage settlement of litigation and claims,

(e) fulfill Federal trust obligations toward Indian tribes,

(f) fulfill the goals of the Endangered Species Act by promoting the enhancement and recovery of the Pyramid Lake fishery; and

(g) protect significant wetlands from further degradation and enhance the habitat of many species of wildlife which depend on those wetlands, and for other purposes.

SEC. 203 DEFINITIONS.

For purposes of this title

(a) the term "*Alpine* court" means the court having continuing jurisdiction over the *Alpine* decree;

(b) the term ""Alpine decree" means the final decree of the United States District Court for the District of Nevada in *United States of America* v. *Alpine Land and Reservoir Company*, Civ No D-183, entered December 18, 1980, and any supplements thereto,

(c) the term "Carson River basin" means the area which naturally drains into the Carson River and its tributaries and into the Carson River Sink, but excluding the Humboldt River drainage area,

(d) the term "Fallon Tribe" means the Fallon Paiute-Shoshone Tribe;

(e) the term "Lahontan Valley wetlands" means wetland areas associated with the Stillwater National Wildlife Refuge, Stillwater Wildlife Management Area, Carson Lake and Pasture, and the Fallon Indian Reservation,

(f) the term "Lake Tahoe basin" means the drainage area naturally tributary to Lake Tahoe, including the lake, and including the Truckee River upstream of the intersection between the Truckee River and the western boundary of Section 12, Township 15 North, Range 16 East, Mount Diablo Base and Meridian,

(g) the term "Lower Truckee River" means the Truckee River below Derby Dam;

(h) the term "Operating Agreement" means the agreement to be negotiated between the Secretary and the States of California and Nevada and others, as more fully described in section 205 of this title,

(i) the term "*Orr Ditch* court" means the court having continuing jurisdiction over the *Orr Ditch* decree,

(j) the term "*Orr Ditch* decree" means the decree of the United States District Court for the District of Nevada in *United States of America* v. *Orr Water Ditch Company*, et al --in Equity, Docket No A3, including, but not limited to the Truckee River Agreement,

(k) the term "Preliminary Settlement Agreement as Modified by the Ratification Agreement" means the document with the title "Ratification Agreement by the United States of America," including Exhibit "1" attached thereto, submitted to the Chairman, Subcommittee on Water and Power, Committee on Energy and Natural Resources, United States Senate, by the Assistant Secretary for Water and Science, United States Department of the Interior, on August 2, 1990, as may be amended under the terms thereof. A copy of this agreement is included in the report of the Committee on Energy and Natural Resources as Appendix 1 to the Committee's report accompanying S. 1554,

(l) the term "Pyramid Lake fishery" means two fish species found in Pyramid Lake, the cui-ui (Chasmistes cujus) and the Lahontan cutthroat trout (Salmo clarki henshawi),

(m) the term "Pyramid Lake Tribe" means the Pyramid Lake Paiute Tribe,

(n) the term "Secretary" means the Secretary of the Interior,

(o) the term "Truckee River Agreement" means a certain agreement dated July 1, 1935 and entered into by the United States of America, Truckee-Carson Irrigation District, Washoe County Water Conservation District, Sierra Pacific Power Company, and other users of the waters of the Truckee River;

(p) the term "Truckee River basin" means the area which naturally drains into the Truckee River and its tributaries and into Pyramid Lake, including that lake, but excluding the Lake Tahoe basin,

(q) the term "*Truckee River General Electric* court" means the United States District Court for the Eastern District of California court having continuing jurisdiction over the *Truckee River General Electric* decree,

(r) the term "*Truckee River General Electric* decree" means the decree entered June 4, 1915, by the United States District Court for the Northern District of California in *United States of America* v *Truckee River General Electric Co* , No 14861, which case was transferred to the United States District Court for the Eastern District of California on February 9, 1968, and is now designated No S-643,

(s) the term "Truckee River reservoirs" means the storage provided by the dam at the outlet of Lake Tahoe, Boca Reservoir, Prosser Creek Reservoir, Martis Reservoir, and Stampede Reservoir; and

(t) the term "1948 Tripartite Agreement" means the agreement between the Truckee-Carson Irrigation District, the Nevada State Board of Fish and Game Commissioners, and the United States Fish and Wildlife Service regarding the establishment, development, operation, and maintenance of Stillwater National Wildlife Refuge and Management Area, dated November 26, 1948.

SEC 204 INTERSTATE ALLOCATION

(a) CARSON RIVER --

(1) The interstate allocation of waters of the Carson River and its tributaries represented by the *Alpine* decree is confirmed

(2) The allocations confirmed in paragraph (1) of this subsection shall not be construed as precluding, foreclosing, or limiting the assertion of any additional right to the waters of the Carson River or its tributaries which were in existence under applicable law as of January 1, 1989, but are not recognized in the *Alpine* decree. The allocation made in paragraph (1) of this subsection shall be modified to accommodate any such additional rights, and such additional rights, if established, shall be administered in accordance with the terms of the *Alpine* decree, except that the total amount of such additional allocations shall not exceed 1,300 acre-feet per year by depletion for use in the State of California and 2,131 acre-feet per-year by depletion for use in the State of Nevada. This paragraph shall not be construed to allow any increase in diversions from the Carson River or its tributaries beyond those in existence on December 31, 1992.

(3) If, on or after the date of enactment of this title, all or any portion of the effluent imported from the Lake Tahoe basin into the watershed of the Carson River in California is discontinued by reason of a change in the place of the disposal of such effluent, including underground disposal, to the Truckee River basin or the Lake Tahoe basin, in a manner which results in increasing the available supply of water in the Nevada portion of the Truckee River basin, the allocation to California of the water of the West Fork of the Carson River and its tributaries for use in the State of California shall be augmented by an amount of water which may be diverted to storage, except that such storage.

(A) shall not interfere with other storage or irrigation rights of Segments 4 and 5 of the Carson River, as defined in the *Alpine* decree,

(B) shall not cause significant adverse effects to fish and wildlife;

(C) shall not exceed 2,000 acre-feet per year, or the quantity by which the available annual supply of water to the Nevada portion of the Truckee River basin is increased, whichever is less, and

(D) shall be available for irrigation use in that or subsequent years, except that the cumulative amount of such storage shall not exceed 2,000 acre-feet in any year

(4) Storage specified by paragraph (3) of this subsection shall compensate the State of California for any such discontinuance as referred to in such paragraph: Provided, That the augmentation authorized by such paragraph shall be used only on lands having appurtenant *Alpine* decree rights. Use of effluent for the irrigation of lands with appurtenant *Alpine* decree rights shall not result in the forfeiture or abandonment of all or any part of such appurtenant *Alpine* decree rights, but use of such wastewater shall not be deemed to create any new or additional water rights. Nothing in this title shall be construed as prohibiting the use of all or any portion of such effluent on any lands within the State of California Any increased water delivered to the Truckee River shall only be available to satisfy existing rights under the *Orr Ditch* decree or, as appropriate, to augment inflows to Pyramid Lake

(5) Nothing in this title shall foreclose the right of either State to study, either jointly or individually, the use of Carson River surface water, which might otherwise be lost to beneficial use, to enable conjunctive use of groundwater. For purposes of this paragraph, beneficial use shall include the use of water on wetlands or wildlife areas within the Carson River basin, as may be permitted under State law

(6) Nothing in this title shall preclude the State of Nevada, agencies of the State of Nevada, private entities, or individuals from constructing storage facilities within the Carson River basin, except that such storage facilities shall be constructed and operated in

accordance with all applicable State and Federal laws and shall not result in the inundation of any portion of the East Fork of the Carson River within California

(7) The right of any water right owner to seek a change in the beneficial use of water from irrigation to storage for municipal and industrial uses or other beneficial uses, as determined by applicable State law, is unaffected by this title Water stored for municipal and industrial uses may be diverted to storage in a given year and held for municipal and industrial uses in that year or subsequent years Such changes and storage shall be in accordance with the *Alpine* decree and applicable State laws

(8) Interbasin transfers of Carson River water shall be allowed only as provided by applicable State law.

(b) LAKE TAHOE.--

(1) Total annual gross diversions for use within the Lake Tahoe basin from all natural sources, including groundwater, and under all water rights in the basin shall not exceed 34,000 acre-feet per year. From this total, 23,000 acre-feet per year are allocated to the State of California for use within the Lake Tahoe basin and 11,000 acre-feet per year are allocated to the State of Nevada for use within the Lake Tahoe basin. Water allocated pursuant to this paragraph may, after use, be exported from the Lake Tahoe basin or reused

(2) Total annual gross diversions for use allocated pursuant to paragraph (1) of this subsection shall be determined in accordance with the following conditions:

(A) Water diverted and used to make snow within the Lake Tahoe basin shall be charged to the allocation of each State as follows

(i) the first 600 acre-feet used in California each year and the first 350 acre-feet used each year in Nevada shall not be charged to the gross diversion allocation of either State;

(ii) where water from the Lake Tahoe basin is diverted and used to make snow in excess of the amounts specified in clause (i) of this subparagraph, the percentage of such diversions chargeable to the gross diversion allocations of each State shall be specified in the Operating Agreement; and

(iii) the provisions of paragraph 204(b)(1) notwithstanding, criteria for charging incidental runoff, if any, into the Carson River basin or the Truckee River basin, including the amount and basin to be charged, from use of water in excess of the amount specified in clause (i) of this subparagraph, shall be specified in the Operating Agreement The amounts of such water, if any, shall be included in each State's report prepared pursuant to paragraph 204(d)(1) of this title.

(B) Unmetered diversion or extraction of water by residences shall, for the purpose of calculating the amount of either State's gross diversion, be conclusively presumed to utilize a gross diversion of four-tenths of one acre-foot per residence per year.

(C) Where water is diverted by a distribution system, as defined in clause (iii) of this subparagraph, the amount of such water that shall be charged to the gross diversion allocation of either California or Nevada shall be measured as follows

(i) where a water distribution system supplies any municipal, commercial, and/or industrial delivery points (not including fire hydrants, flushing or cleaning points), any one of which is not equipped with a water meter, the gross diversion attributed to that water distribution system shall be measured at the point of diversion or extraction from the source, or

(ii) where all municipal, commercial, and industrial delivery points (not including fire hydrants, flushing or cleaning points) within a water distribution system are equipped with a water meter, the gross diversion attributed to that water distribution system may be measured as the sum of all amounts of water supplied to each such delivery point, provided there is in effect for such water distribution system a water conservation and management plan Such plan may be either an individual, local plan or an area-wide, regional, or basin-wide plan, except that such plan must be reviewed and found to be reasonable under all relevant circumstances by the State agency responsible for administering water rights, or any other entity delegated such responsibility under State law Such plan must be reviewed every five years by the agency which prepared it, and implemented in accordance with its adopted schedule, and shall include all elements required by applicable State law and the following:

(a) an estimate of past, current, and projected water use and, to the extent records are available, a segregation of those uses between residential, industrial, and governmental uses;

(b) identification of conservation measures currently adopted and in practice;

(c) a description of alternative conservation measures, including leak detection and prevention and reduction in unaccounted for water, if any, which would improve the efficiency of water use, with an evaluation of the costs, and significant environmental and other impacts of such measures,

(d) a schedule of implementation for proposed actions as indicated by the plan,

(e) a description of the frequency and magnitude of supply deficiencies, including conditions of drought and emergency, and the ability to meet short-term deficiencies;

(f) an evaluation of management of water system pressures and peak demands;

(g) an evaluation of incentives to alter water use practices, including fixture and appliance retrofit programs;

(h) an evaluation of public information and educational programs to promote wise use and eliminate waste;

(i) an evaluation of changes in pricing, rate structure, and regulations, and

(j) an evaluation of alternative water management practices, taking into account economic and non-economic factors (including environmental, social, health, and customer impact), technological factors, and incremental costs of additional supplies

(iii) As used in this subparagraph, the term "water distribution system" means a point or points of diversion from a water supply source or sources, together with associated piping, which serve a number of identifiable delivery points: Provided, That the distribution system is not operationally interconnected with other distribution systems (except for emergency cross-ties) which are served from other points of diversion An agency serving municipal and industrial water may have more than one water distribution system.

(iv) If a program for the review of water conservation and management plans as provided in clause (ii) of this subparagraph is not in effect in that portion of the Lake Tahoe basin within a State, all gross diversions within such State shall be measured at the point of diversion

(D) For the purpose of this subsection, water inflow and infiltration to sewer lines shall not be considered a diversion of water, and such water shall not be charged to the gross diversion allocation of either State

(E) Regulation of streamflow for the purpose of preserving or enhancing instream beneficial uses shall not be charged to the gross diversion allocation of either State

(3) The transbasin diversions from the Lake Tahoe basin in Nevada and California identified in this paragraph may be continued, to the extent that such diversions are recognized as vested or perfected rights under the laws of the State where each diversion is made Unless otherwise provided in this subsection, such diversions are in addition to the other allocations made by this subsection Such transbasin diversions are the following:

(A) diversion of a maximum of 3,000 acre-feet per year from Marlette Lake for use in Nevada,

(B) diversion of a maximum of 561 acre-feet per year from Lake Tahoe for use in Nevada as set forth in Nevada Permit to Appropriate Water No 23017, except that such diversion shall count against the allocation to Nevada made by this subsection,

(C) diversion of water from Echo Lake for use in California, pursuant to rights vested under California law, and

(D) diversion of water from North Creek as set forth in the State of Nevada Certificate of Appropriation of Water No 4217

The transbasin diversions identified in subparagraphs (A), (C), and (D) of this paragraph may be transferred, for use only in the State where the recognized transbasin diversion exists, by lease of the right of use or by conveyance of the right, to the extent to which the right is vested or has been perfected

Any such transfer shall be subject to the applicable laws of the State in which the right is vested or perfected The transbasin diversion described in subparagraph (B) of this paragraph may be transferred in accordance with State law. With the exception of the transbasin diversion described in subparagraph (B), all water made available for use within the Lake Tahoe basin as a result of any such transfer shall not be charged against the allocations made by this section, and such water may be depleted

(c) TRUCKEE RIVER --

(1) There is allocated to the State of California the right to divert or extract, or to utilize any combination thereof, within the Truckee River basin in California the gross amount of 32,000 acre-feet of water per year from all natural sources, including both surface and groundwater, in the Truckee River basin subject to the following terms and conditions

(A) maximum annual diversion of surface supplies shall not exceed 10,000 acre-feet, except that all diversions of surface supplies for use within California shall be subject to the right to water for use on the Pyramid Lake Indian Reservation in amounts as provided in Claim Nos. 1 and 2 of the *Orr Ditch* decree, and all such diversions initiated after the date of enactment of this title shall be subject to the right of the Sierra Pacific Power Company or its successor to divert forty (40) cubic feet per second of water for municipal, industrial, and domestic use in the Truckee Meadows in Nevada, as such right is more particularly described in Article V of the Truckee River Agreement,

(B) all new wells drilled after the date of enactment of this title shall be designed to minimize any short-term reductions of surface streamflows to the maximum extent feasible;

(C) any use within the State of Nevada of any Truckee River basin groundwater with a point of extraction within California shall be subordinate to existing and future uses in California, and any such use of water in Nevada shall cease to the extent that it causes extractions to exceed safe yield;

(D) except as otherwise provided in this paragraph, the extraction and use of groundwater pursuant to this subsection shall be subject to all terms and conditions of California law,

(E) determination of safe yield of any groundwater basin in the Truckee River basin in California shall be made by the United States Geological Survey in accordance with California law,

(F) water shall not be diverted from within the Truckee River basin in California for use in California outside the Truckee River basin,

(G) if the Tahoe-Truckee Sanitation Agency or its successor (hereafter "TTSA") changes in whole or in part the place of disposal of its treated wastewater to a place outside the area between Martis Creek and the Truckee River below elevation 5800 NGVD Datum, or changes the existing method of disposing of its wastewater, which change in place or method of disposal reduces the amount or substantially changes the timing of return flows to the Truckee River of the treated wastewater, TTSA shall:

(i) acquire or arrange for the acquisition of preexisting water rights to divert and use water of the Truckee River or its tributaries in California or Nevada and discontinue the diversion and use of water at the preexisting point of diversion and place of use under such rights in a manner legally sufficient to offset such reduction in the amount of return flow or change in timing, and California's Truckee River basin gross diversion allocation shall continue to be charged the amount of the discontinued diversion, or

(ii) in compliance with California law, extract and discharge into the Truckee River or its tributaries an amount of Truckee River basin groundwater in California sufficient to offset such reduction or change in timing, subject to the following conditions:

(a) extraction and discharge of Truckee River Basin groundwater for purposes of this paragraph shall comply with the terms and conditions of subparagraphs 204(c)(1)(B) and (D) and shall not be deemed use of Truckee River basin groundwater within the State of Nevada within the meaning of subparagraph 204(c)(1)(D); and

(b) California's Truckee River basin gross diversion allocation shall be charged immediately with the amount of groundwater discharged and, when California's Truckee River Basin gross diversion allocation equals 22,000 acre-feet or when the total of any reductions resulting from the changes in the place or method of disposal exceed 1000 acre-feet, whichever occurs first, the California Truckee River basin gross diversion allocation shall thereafter be charged with an additional amount of water required to compensate for the return flows which would otherwise have accrued to the Truckee River basin from municipal and industrial use of the discharged groundwater In no event shall the total of California's Truckee River gross diversions and extractions exceed 32,000 acre-feet.

(iii) For purposes of this paragraph, the existing method of disposal shall include, in addition to underground leach field disposal, surface spray or sprinkler infiltration of treated wastewater on the site between Martis Creek and the Truckee River referred to in this subsection

(iv) The provisions of this paragraph requiring the acquisition of water rights or the extraction and discharge of groundwater to offset reductions in the amount or timing of return flow to the Truckee River shall also apply to entities other than TTSA that may treat and dispose of wastewater within the California portion of the Truckee River basin, but only if and to the extent that the treated wastewater is not returned to the Truckee River or its tributaries, as to timing and amount, substantially as if the wastewater had been treated and disposed of by TTSA in its existing place of disposal and by its existing method of disposal. The provisions of this paragraph shall not apply to entities treating and disposing of the wastewater from less than eight dwelling units.

(H) All uses of water for commercial, irrigated agriculture within the Truckee River basin within California initiated after the date of enactment of this title shall not impair and shall be junior and subordinate to all beneficial uses in Nevada, including, but not limited to, the use of water for the maintenance and preservation of the Pyramid Lake fishery. As

used in this provision, the term "commercial, irrigated agriculture" shall include traditional commercial irrigated farming operations but shall not include the following uses irrigated golf courses and other recreational facilities, commercial nurseries, normal silvicultural activities other than commercial tree farms, irrigation under riparian rights on land irrigated at any time prior to the date of enactment of this title, lawns and ornamental shrubbery on parcels which include commercial, residential, governmental, or public buildings, and irrigated areas of two acres or less on parcels which include a residence.

(I) Water diverted within the Truckee River basin and used to make snow shall be charged to California's Truckee River allocation as follows:

(i) the first 225 acre-feet used in California each year shall not be charged to the gross diversion allocation,

(ii) where water from the Truckee River basin is diverted and used to make snow in excess of the amounts specified in clause (i) of this subparagraph, the percentage of such diversions chargeable to such allocation shall be specified in the Operating Agreement; and

(iii) the provision of subparagraph 204(c)(1)(F) notwithstanding, criteria for charging incidental runoff, if any, into the Lake Tahoe basin, including the amount and basin to be charged, from use of water in excess of the amount specified in clause (i) of this subparagraph, shall be specified in the Operating Agreement. The amounts of such water, if any, shall be included in each State's report prepared pursuant to paragraph 204(d)(1)

(J) Unmetered diversion or extraction of water by residences, shall, for the purpose of calculating the amount of California's gross diversion, be conclusively presumed to utilize a gross diversion of four- tenths of one acre-foot per residence per year

(K) For the purposes of this subsection, water inflow and infiltration to sewer lines is not a diversion of water, and such water shall not be charged to California's Truckee River basin allocation.

(2) There is additionally allocated to California the amount of water decreed to the Sierra Valley Water Company by judgment in the case of *United States of America* v *Sierra Valley Water Company*, United States District Court for the Northern District of California, Civil No 5597, as limited by said judgment

(3) There is allocated to the State of Nevada all water in excess of the allocations made in paragraphs 204(c)(1) and (2) of this title

(4) The right to water for use on the Pyramid Lake Indian Reservation in the amounts provided in Claim Nos 1 and 2 of the *Orr Ditch* decree is recognized and confirmed In accordance with and subject to the terms of the *Orr Ditch* decree and applicable law, the United States, acting for and on behalf of the Pyramid Lake Tribe, and with the agreement of the Pyramid Lake Tribe, or the Pyramid Lake Tribe shall have the right to change points of diversion, place, means, manner, or purpose of use of the water so decreed on the reservation.

(d) COMPLIANCE --

(1) Compliance with the allocations made by this section and with other provisions of this section applicable to each State shall be assured by each State. With the third quarter following the end of each calendar year, each State shall publish a report of water use providing information necessary to determine compliance with the terms and conditions of this section.

(2) The United States District Courts for the Eastern District of California and the District of Nevada shall have jurisdiction to hear and decide any claims by any aggrieved party against the State of California, State of Nevada, or any other party where such claims allege failure to comply with the allocations or any other provision of this section Normal rules of venue and transfers of cases between Federal courts shall remain in full force and effect. Each State, by accepting the allocations under this section, shall be deemed to have waived any immunity from the jurisdiction of such courts.

(e) FORFEITURE OR ABANDONMENT.--The provisions of this section shall not be interpreted to alter or affect the applicability of the law of each State regarding the forfeiture for nonuse or abandonment of any water right established in accordance with State law, nor shall the forfeiture for nonuse or abandonment of water rights under the applicable law of each State affect the allocations to each State made by this title.

(f) INTERSTATE TRANSFERS.--

(1) Nothing in this title shall prevent the interstate transfer of water or water rights for use within the Truckee River basin, subject to the following provisions

(A) Each such interstate transfer shall comply with all State laws applicable to transfer of water or water rights, including but not limited to State laws regulating change in point of diversion, place of use, and purpose of use of water, except that such laws must apply equally to interstate and intrastate transfers.

(B) Use of water so transferred shall be charged to the allocation of the State wherein use of water was being made prior to the transfer.

(C) Subject to subparagraph (A) of this paragraph, in addition to the application of State laws intended to prevent injury to other lawful users of water, each State may, to the extent authorized by State law, deny or condition a proposed interstate transfer of water or water rights having a source within the Truckee River basin where the State agency responsible for administering water rights finds, on the basis of substantial evidence that the transfer would have substantial adverse impacts on the environment or overall economy of the area from which the use of the water or water right would be transferred.

(D) Nothing in this paragraph shall be construed to limit the jurisdiction of any court to review any action taken pursuant to this paragraph

(2) The jurisdiction of the *Alpine* court to administer, inter alia, interstate transfers of water or water rights on the Carson River under the *Alpine* decree, pursuant to jurisdiction reserved therein, including any amendment or supplement thereto, is confirmed. Each State may intervene of right in any proceeding before the *Alpine* court wherein the reserved jurisdiction of that court is invoked with respect to an interstate transfer of water or water rights, and may report to the court findings or decisions concerning the proposed change which have been made by the State agency responsible for administering water rights under any State law applicable to transfers or change in the point of diversion, purpose of use, or place of use of water

(3) This subsection shall not be construed to authorize the State of California or the State of Nevada to deny or condition a transfer application made by the United States or its agencies if such denial or conditioning would be inconsistent with any clear congressional directive.

(g) USE OF WATER BY THE UNITED STATES --Use of water by the United States of America or any of its agencies or instrumentalities, or by any Indian Tribe shall be charged to the allocation of the State wherein the use is made, except as otherwise provided in subsection (f) of this section

(h) COURT DECREES.--Nothing in this section shall be construed as modifying or terminating any court decree, or the jurisdiction of any court

(i) PLACE OF USE TO DETERMINE ALLOCATION.--Water diverted or extracted in one State for use in the other shall be charged to the allocation under this section of the

State in which the water is used, except as otherwise provided in subsection (f) of this section.

(j) APPLICABILITY OF STATE LAW.--Nothing in this section shall be construed to alter the applicability of State law or procedures to the water allocated to the States hereunder

SEC. 205 TRUCKEE RIVER WATER SUPPLY MANAGEMENT.

(a) OPERATING AGREEMENT.--

(1) The Secretary shall negotiate an operating agreement (hereafter "Operating Agreement") with the State of Nevada and the State of California, after consultation with such other parties as may be designated by the Secretary, the State of Nevada or the State of California

(2) The Operating Agreement shall provide for the operation of the Truckee River reservoirs and shall ensure that the reservoirs will be operated to:

(A) satisfy all applicable dam safety and flood control requirements,

(B) provide for the enhancement of spawning flows available in the Lower Truckee River for the Pyramid Lake fishery in a manner consistent with the Secretary's responsibilities under the Endangered Species Act, as amended,

(C) carry out the terms, conditions, and contingencies of the Preliminary Settlement Agreement as modified by the Ratification Agreement. Mitigation necessary to reduce or avoid significant adverse environmental effects, if any, of the implementation of the Preliminary Settlement Agreement as modified by the Ratification Agreement, including instream beneficial uses of water within the Truckee River basin, shall be provided through one or more mitigation agreements which shall be negotiated and executed by the parties to the Preliminary Settlement Agreement as modified by the Ratification agreement and the appropriate agencies of the States of Nevada and California,

(D) ensure that water is stored in and released from Truckee River reservoirs to satisfy the exercise of water rights in conformance with the *Orr Ditch* decree and *Truckee River General Electric* decree, except for those rights that are voluntarily relinquished by the parties to the Preliminary Settlement Agreement as modified by the Ratification Agreement, or by any other persons or entities, or which are transferred pursuant to State law, and

(E) minimize the Secretary's costs associated with operation and maintenance of Stampede Reservoir

(3) The Operating Agreement may include, but is not limited to, provisions concerning the following subjects

(A) administration of the Operating Agreement, including but not limited to establishing or designating an agency or court to oversee operation of the Truckee River and Truckee River reservoirs,

(B) means of assuring compliance with the provisions of the Preliminary Settlement Agreement as modified by the Ratification Agreement and the Operating Agreement;

(C) operations of the Truckee River system which will not be changed,

(D) operations and procedures for use of Federal facilities for the purpose of meeting the Secretary's responsibilities under the Endangered Species Act, as amended,

(E) methods to diminish the likelihood of Lake Tahoe dropping below its natural rim and to improve the efficient use of Lake Tahoe water under extreme drought conditions,

(F) procedures for management and operations at the Truckee River reservoirs,

(G) procedures for operation of the Truckee River reservoirs for instream beneficial uses of water within the Truckee River basin;

(H) operation of other reservoirs in the Truckee River basin to the extent that owners of affected storage rights become parties to the Operating Agreement; and

(I) procedures and criteria for implementing California's allocation of Truckee River water.

(4) To enter into effect, the Operating Agreement shall be executed by the Secretary, the State of Nevada, and the State of California and shall be submitted to the *Orr Ditch* court and the *Truckee River General Electric* court for approval of any necessary modifications in the provisions of the *Orr Ditch* decree or the *Truckee River General Electric* decree Other affected parties may be offered the opportunity to execute the Operating Agreement.

(5) When an Operating Agreement meeting the requirements of this subsection has been approved by the Secretary, the State of Nevada, and the State of California, the Secretary, pursuant to title 5 of the United States Code, shall promulgate the Operating Agreement, together with such additional measures as have been agreed to by the Secretary, the State of Nevada, and the State of California, as the exclusive Federal regulations governing the Operating Agreement. The Secretary and the other signatories to the Operating Agreement shall, if necessary, develop and implement a plan to mitigate for any significant adverse environmental impacts resulting from the Operating Agreement Any subsequent changes to the Operating Agreement must be adopted and promulgated in the same manner as the original Operating Agreement Any changes which affect the Preliminary Settlement Agreement as modified by the Ratification Agreement must also be approved by the signatories thereto. Judicial review of any such promulgation of the Operating Agreement may be had by any aggrieved party in the United States District Court for the Eastern District of California or the United States District Court for District of Nevada A request for review must be filed not later than 90 days after the promulgation of the Operating Agreement becomes final, and by a person who participated in the administrative proceedings leading to the final promulgation. The scope of such review shall be limited to the administrative record and the standard of review shall be that prescribed in 5 U S.C 706(2)(A)-(D) Provided, That the limits on judicial review in this paragraph shall not apply to any claim based on the provisions of the Endangered Species Act, as amended

(6) The Secretary shall take such other actions as are necessary to implement the Preliminary Settlement Agreement as modified by the Ratification Agreement and to implement the Operating Agreement, including entering into contracts for the use of space in Truckee River reservoirs for the purposes of storing or exchanging water, subject to the preconditions that the Sierra Pacific Power Company and the Secretary shall have executed a mutually satisfactory agreement for payment by Sierra-Pacific Power Company of appropriate amounts for the availability and use of storage capacity in Stampede Reservoir and other reservoirs

(7) As provided in the Preliminary Settlement Agreement as modified by the Ratification Agreement, firm and non-firm municipal and industrial credit water and the 7,500 acre-feet of fishery credit water in Stampede Reservoir to be available under worse than critical drought conditions shall be used only to supply municipal and industrial needs when drought conditions or emergency or repair conditions exist, or as may be required to be converted to fishery credit water None of these quantities of water shall be used to

serve normal year municipal and industrial needs except when an emergency or repair condition exists

(8) Subject to the terms and conditions of the Preliminary Settlement Agreement as modified by the Ratification Agreement, all of the fishery credit water established thereunder shall be used by the United States solely for the benefit of the Pyramid Lake fishery.

(9) In negotiating the Operating Agreement, the Secretary shall satisfy the requirements of the National Environmental Policy Act and regulations issued to implement the provisions thereof. The Secretary may not become a party to the Operating Agreement if the Secretary determines that the effects of such action, together with cumulative effects, are likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of any designated critical habitat of such species.

(b) AUTHORIZATION FOR USE OF WASHOE PROJECT FACILITIES, TRUCKEE RIVER STORAGE FACILITIES, AND LAKE TAHOE DAM AND RESERVOIR.--

(1) The Secretary is authorized to use Washoe Project facilities, Truckee River Storage Project facilities, and Lake Tahoe Dam and Reservoir for the storage of non-project water to fulfill the purposes of this title, including the Preliminary Settlement Agreement as modified by the Ratification Agreement and the Operating Agreement The Secretary shall collect appropriate charges for such uses

(2) Payments received by the Secretary pursuant to this subsection and paragraph 205(a)(6) shall be credited annually first to pay the operation and maintenance costs of Stampede Reservoir, then covered into the Lahontan Valley and Pyramid Lake Fish and Wildlife Fund created pursuant to subsection 206(f) of this title, with funds not needed for those purposes, if any, credited to the Reclamation Fund.

(3) The Secretary is authorized to enter into an interim agreement with the Sierra Pacific Power Company and Pyramid Lake Tribe to store water owned by Sierra Pacific Power Company in Stampede Reservoir, except that the amount of such storage shall not exceed 5,000 acre-feet on September 1 of any year, such agreement shall be superseded by the Preliminary Settlement as modified by the Ratification Agreement and the Operating Agreement upon the entry into effect of those agreements.

(c) RELEASE OF WASHOE PROJECT REPAYMENT OBLIGATION.--The Secretary is released from any obligation to secure payment for the costs of constructing Washoe Project facilities, other than the power plant, including those specified in the Act of August 1, 1956, 70 Stat. 775, and under Federal reclamation laws, and such costs are hereby made non-reimbursable Authority to construct a reservoir at the Watasheamu site, together with other necessary works for impoundment, diversion, and delivery of water, generation and transmission of hydroelectric power, and drainage of lands as conferred to the Secretary in the Act of August 1, 1956, 70 Stat. 775, is hereby revoked.

SEC 206 WETLANDS PROTECTION.

(a) AUTHORIZATION TO PURCHASE WATER RIGHTS --

(1) The Secretary is authorized and directed, in conjunction with the State of Nevada and such other parties as may provide water and water rights for the purposes of this section, to acquire by purchase or other means water and water rights, with or without the lands to which such rights are appurtenant, and to transfer, hold, and exercise such water and water rights and related interests to sustain, on a long-term average, approximately 25,000 acres of primary wetland habitat within the Lahontan Valley wetlands in accordance with the following provisions of this subsection:

(A) water rights acquired under this subsection shall, to the maximum extent practicable, be used for direct application to such wetlands and shall not be sold, exchanged, or otherwise disposed of except as provided by the National Wildlife Refuge Administration Act and for the benefit of fish and wildlife within the Lahontan Valley,

(B) the Secretary shall select from any water rights acquired pursuant to this subsection those water rights or portions thereof, if not all, that can be transferred to the wetlands referenced in this subsection consistent with subsection 209(b) of this title; and

(C) in implementing this subsection, the Secretary shall consult with the State of Nevada and affected interests. Those water rights or portions thereof, if not all, which the Secretary selects for transfer shall then be transferred in accordance with applicable court decrees and State law, and shall be used to apply water directly to wetlands. No water rights shall be purchased, however, unless the Secretary expects that the water rights can be so transferred and applied to direct use to a substantial degree.

(2) Acquisition of water rights and related interests pursuant to this subsection shall be subject to the following conditions:

(A) water right purchases shall be only from willing sellers, but the Secretary may target purchases in areas deemed by the Secretary to be most beneficial to such a purchase program,

(B) water rights acquired by the Secretary shall be managed by the Secretary after consultation with the State of Nevada and affected interests, except that any water rights acquired for Fallon Indian Reservation wetlands shall be managed by the Secretary in consultation with the Fallon Tribe, and

(C) prior to acquiring any water or water rights in the State of California for the Lahontan Valley wetlands, the Secretary shall first consult with the Governor of California and shall prepare a record of decision on the basis of such consultations.

(3) The Secretary is authorized to:

(A) use, modify, or extend, on a non-reimbursable basis, Federal water diversion, storage, and conveyance systems to deliver water to wetlands referenced in paragraph (a)(1) of this subsection, including the Fernley Wildlife Management Area;

(B) reimburse non-Federal entities for reasonable and customary costs for operation and maintenance of the Newlands Project associated with the delivery of water in carrying out the provisions of this subsection; and

(C) enter into renewable contracts for the payment of reasonable and customary costs for operation and maintenance of the Newlands Project associated with the delivery of water acquired by the Secretary to benefit the Lahontan Valley wetlands. The contracts shall be for a term not exceeding 40 years. Any such contract shall provide that upon the failure of the Secretary to pay such charges, the United States shall be liable for their payment and other costs provided for in applicable provisions of the contract, subject to the availability of appropriations

(4) Consistent with fulfillment of this subsection and not as a precondition thereto, the Secretary shall study and report on the social, economic, and environmental effects of the water rights purchase program authorized by this subsection and the water management measures authorized by subsection 206(c). This study may be conducted in coordination with the studies authorized by paragraph 207(c)(5) and subsection 209(c) of this title, and shall be reported to the Committees on Energy and Natural Resources, Environment and Public Works, and Appropriations of the Senate, and the Committees on Interior and

Insular Affairs, Merchant Marine and Fisheries, and Appropriations of the House of Representatives not later than three years after the date of enactment of this Act

(b) EXPANSION OF STILLWATER NATIONAL WILDLIFE REFUGE --

(1) Notwithstanding any other provisions of law, the Secretary shall manage approximately 77,520 acres of Federal land in the State of Nevada, as depicted upon a map entitled "Stillwater National Wildlife Refuge," dated July 16, 1990, and available for inspection in appropriate offices of the United States Fish and Wildlife Service, as a unit of the National Wildlife Refuge System

(2) The lands identified in paragraph (1) of this subsection shall be known as the Stillwater National Wildlife Refuge and shall be managed by the Secretary through the United States Fish and Wildlife Service for the purposes of

(A) maintaining and restoring natural biological diversity within the refuge,

(B) providing for the conservation and management of fish and wildlife and their habitats within the refuge,

(C) fulfilling the international treaty obligations of the United States with respect to fish and wildlife, and

(D) providing opportunities for scientific research, environmental education, and fish and wildlife oriented recreation

(3) The Secretary shall administer all lands, waters, and interests therein transferred under this title in accordance with the provisions of the National Wildlife Refuge System Administration Act of 1966, as amended, except that any activity provided for under the terms of the 1948 Tripartite Agreement may continue under the terms of that agreement until its expiration date, unless such agreement is otherwise terminated The Secretary may utilize such additional statutory authority as may be available to the Secretary for the conservation and development of wildlife and natural resources, interpretive education, and outdoor recreation as the Secretary deems appropriate to carry out the purposes of this title

(4) The Secretary is authorized to take such actions as may be necessary to prevent, correct, or mitigate for adverse water quality and fish and wildlife habitat conditions attributable to agricultural drain water originating from lands irrigated by the Newlands Project, except that nothing in this subsection shall be construed to preclude the use of the lands referred to in paragraph (1) of this subsection for Newlands Project drainage purposes Such actions, if taken with respect to drains located on the Fallon Indian Reservation, shall be taken after consultation with the Fallon Tribe

(5) Not later than November 26, 1997, after consultation with the State of Nevada and affected local interests, the Secretary shall submit to the Congress recommendations, if any, concerning

(A) revisions in the boundaries of the Stillwater National Wildlife Refuge as may be appropriate to carry out the purposes of the Stillwater National Wildlife Refuge, and the provisions of subsection 206(a) of this section;

(B) transfer of any other United States Bureau of Reclamation withdrawn public lands within existing wildlife use areas in the Lahontan Valley to the United States Fish and Wildlife Service for addition to the National Wildlife Refuge System, and

(C) identification of those lands currently under the jurisdiction of the United States Fish and Wildlife Service in the Lahontan Valley that no longer warrant continued status as units of the National Wildlife Refuge System, with recommendations for their disposition

(c) WATER USE, NAVAL AIR STATION, FALLON, NEVADA --

(1) Not later than one year after the date of enactment of this title, the Secretary of the Navy, in consultation with the Secretary, shall undertake a study to develop land management plans or measures to achieve dust control, fire abatement and safety, and foreign object damage control on those lands owned by the United States within the Naval Air Station at Fallon, Nevada, in a manner that, to the maximum extent practicable, reduce direct surface deliveries of water Water saved or conserved shall be defined as reduced project deliveries relative to the maximum annual headgate delivery entitlement associated with recently irrigated water-righted Navy lands Recently irrigated water-righted Navy lands shall be determined by the Secretary of the Navy in consultation with the Secretary and the State of Nevada.

(2) The Secretary of the Navy shall promptly select and implement land management plans or measures developed by the study described in paragraph (1) of this subsection upon determining that water savings can be made without impairing the safety of operations at Naval Air Station, Fallon

(3) All water no longer used and water rights no longer exercised by the Secretary of the Navy as a result of the implementation of the modified land management plan or measures specified by this subsection shall be managed by the Secretary for the benefit of fish and wildlife resources referenced in sections 206 and 207 of this title: Provided, That,

(A) as may be required to fulfill the Secretary's responsibilities under the Endangered Species Act, as amended, the Secretary shall manage such water and water rights primarily for the conservation of the Pyramid Lake fishery and in a manner which is consistent with the Secretary's responsibilities under the Endangered Species Act, as amended, and the requirements of applicable operating criteria and procedures for the Newlands Project; and

(B) the Secretary may manage such water or transfer temporarily or permanently some or all of the water rights no longer exercised by the Secretary of the Navy for the benefit of the Lahontan Valley wetlands so long as such management or transfers are consistent with applicable operating criteria and procedures

(4) The Secretary of the Navy, in consultation with the Secretary of Agriculture and other interested parties, shall fund and implement a demonstration project and test site for the cultivation and development of low-precipitation grasses, shrubs, and other native or appropriate high-desert plant species, including the development of appropriate soil stabilization and land management techniques, with the goal of restoring previously irrigated farmland in the Newlands Project area to a stable and ecologically appropriate dryland condition

(5) The Secretary shall reimburse appropriate non-Federal entities for reasonable and customary operation and maintenance costs associated with delivery of the water that comes under the Secretary's management pursuant to this subsection.

(6) In carrying out the provisions of this subsection, the Secretary of the Navy and the Secretary shall comply with all applicable provisions of State law and fulfill the Federal trust obligation to the Pyramid Lake Tribe and the Fallon Tribe.

(d) STATE COST-SHARING --The Secretary is authorized to enter into an agreement with the State of Nevada for use by the State of not less than $9 million of State funds for water and water rights acquisitions and other protective measures to benefit Lahontan Valley wetlands The Secretary's authority under subsection 206(a) is contingent upon the State of Nevada making such sums available pursuant to the terms of the agreement referenced in this subsection

(e) TRANSFER OF CARSON LAKE AND PASTURE.--The Secretary is authorized to convey to the State of Nevada Federal lands in the area known generally as the "Carson Lake and Pasture," as depicted on the map entitled "Carson Lake Area," dated July 16, 1990, for use by the State as a State wildlife refuge Prior to and as a condition of such

transfer, the Secretary and the State of Nevada shall execute an agreement, in consultation with affected local interests, including the operator of the Newlands Project, ensuring that the Carson Lake and Pasture shall be managed in a manner consistent with applicable international agreements and designation of the area as a component of the Western Hemisphere Shorebird Reserve Network. The Secretary shall retain a right of reverter under such conveyance if the terms of the agreement are not observed by the State. The official map shall be on file with the United States Fish and Wildlife Service. Carson Lake and Pasture shall be eligible for receipt of water through Newlands Project facilities.

(f) LAHONTAN VALLEY AND PYRAMID LAKE FISH AND WILDLIFE FUND.--

(1) There is hereby established in the Treasury of the United States the "Lahontan Valley and Pyramid Lake Fish and Wildlife Fund" which shall be available for deposit of donations from any source and funds provided under subsections 205(a) and (b), 206(d), and subparagraph 208(a)(2)(C), if any, of this title

(2) Moneys deposited into this fund shall be available for appropriation to the Secretary for fish and wildlife programs for Lahontan Valley consistent with this section and for protection and restoration of the Pyramid Lake fishery consistent with plans prepared under subsection 207(a) of this title The Secretary shall endeavor to distribute benefits from this fund on an equal basis between the Pyramid Lake fishery and the Lahontan Valley wetlands, except that moneys deposited into the fund by the State of Nevada or donated by non-Federal entities or individuals for express purposes shall be available only for such purposes and may be expended without further appropriation, and funds deposited under subparagraph 208(a)(2)(C) shall only be available for the benefit of the Pyramid Lake fishery and may be expended without further appropriation

(g) INDIAN LAKES AREA --The Secretary is authorized to convey to the State of Nevada or Churchill County, Nevada, Federal lands in the area generally known as the Indian Lakes area, as depicted on the map entitled "Indian Lakes Area," dated July 16, 1990, pursuant to an agreement between the Secretary and the State of Nevada or Churchill County, Nevada, as appropriate, for the purposes of fish and wildlife, and recreation. Any activity provided under the terms of the 1948 Tripartite Agreement may continue under the terms of that agreement until its expiration date, unless such agreement is otherwise terminated The official map shall be on file with the United States Fish and Wildlife Service

SEC 207 CUI-UI AND LAHONTAN CUTTHROAT TROUT RECOVERY AND ENHANCEMENT PROGRAM.

(a) RECOVERY PLANS --Pursuant to the Endangered Species Act, as amended, the Secretary shall expeditiously revise, update, and implement plans for the conservation and recovery of the cui-ui and Lahontan cutthroat trout Such plans shall be completed and updated from time to time as appropriate in accordance with the Endangered Species Act, as amended, and shall include all relevant measures necessary to conserve and recover the species Such plans and any amendments and revisions thereto shall take into account and be implemented in a manner consistent with the allocations of water to the State of Nevada and the State of California made under section 204 of this title, the Preliminary Settlement Agreement as modified by the Ratification Agreement, and the Operating Agreement, if and when those allocations and agreements enter into effect.

(b) TRUCKEE RIVER REHABILITATION.--

(1) The Secretary of the Army, in consultation with and with the assistance of the Pyramid Lake Tribe, State of Nevada, Environmental Protection Agency, the Secretary, and other interested parties, is authorized and directed to incorporate into its ongoing reconnaissance level study of the Truckee River, a study of the rehabilitation of the lower Truckee River to and including the river terminus delta at Pyramid Lake, for the benefit of the Pyramid Lake fishery. Such study shall analyze, among other relevant factors, the feasibility of·

(A) restoring riparian habitat and vegetative cover;

(B) stabilizing the course of the Truckee River to minimize erosion;

(C) improving spawning and migratory habitat for the cui-ui;

(D) improving spawning and migratory habitat for the Lahontan cutthroat trout; and

(E) improving or replacing existing facilities, or creating new facilities, to enable the efficient passage of cui-ui and Lahontan cutthroat trout through or around the delta at the mouth of the Truckee River, and to upstream reaches above Derby Dam, to obtain access to upstream spawning habitat

(2) There are authorized to be appropriated to the Secretary of the Army such funds as are necessary to supplement the on-going reconnaissance level study, referenced in paragraph (1), to address and report on the activities and facilities described in that paragraph.

(c) ACQUISITION OF WATER RIGHTS.--

(1) The Secretary is authorized to acquire water and water rights, with or without the lands to which such rights are appurtenant, and to transfer, hold, and exercise such water and water rights and related interests to assist the conservation and recovery of the Pyramid Lake fishery in accordance with the provisions of this subsection. Water rights acquired under this subsection shall be exercised in a manner consistent with the Operating Agreement and the Preliminary Settlement Agreement as modified by the Ratification Agreement and, to the maximum extent practicable, used for the benefit of the Pyramid Lake fishery and shall not be sold, exchanged, or otherwise disposed of except to the benefit of the Pyramid Lake fishery.

(2) Acquisition of water rights and related interests pursuant to this subsection shall be subject to the following conditions:

(A) water rights acquired must satisfy eligibility criteria adopted by the Secretary,

(B) water right purchases shall be only from willing sellers, but the Secretary may target purchases in areas deemed by the Secretary to be most beneficial to such a purchase program;

(C) prior to acquiring any water or water rights in the State of California for the Pyramid Lake fishery, the Secretary shall first consult with the Governor of California and prepare a record of decision on the basis of such consultation,

(D) all water rights shall be transferred in accordance with any applicable State law; and

(E) water rights acquired by the Secretary shall be managed by the Secretary in consultation with the Pyramid Lake Tribe and affected interests.

(3) Nothing in this subsection shall be construed as limiting or affecting the authority of the Secretary to acquire water and water rights under other applicable laws

(4) The Secretary is authorized to reimburse non-Federal entities for reasonable and customary costs for operation and maintenance of the Newlands Project associated with the delivery of water in carrying out the provisions of this subsection

(5) Consistent with fulfillment of this section and not as a precondition thereto, the Secretary shall study and report on the social, economic, and environmental effects of the water rights purchase program authorized by this section. This study may be conducted in coordination with the studies authorized by paragraph 206(a)(4) and subsection 209(c) of this title, and shall be reported to the Committees on Energy and Natural Resources, Environment and Public Works, and Appropriations of the Senate, and the Committees on Interior and Insular Affairs, Merchant Marine and Fisheries, and Appropriations of the House of Representatives not later than three years after the date of enactment of this title.

(d) USE OF STAMPEDE AND PROSSER RESERVOIRS.--

(1) The rights of the United States to store water in Stampede Reservoir shall be used by the Secretary for the conservation of the Pyramid Lake fishery, except that such use must be consistent with the Preliminary Settlement Agreement as modified by the Ratification Agreement, the Operating Agreement, and the mitigation agreement specified in subparagraph 205(a)(1)(C) of this title.

(2) The rights of the United States to store water in Prosser Creek Reservoir shall be used by the Secretary as may be required to restore and maintain the Pyramid Lake fishery pursuant to the Endangered Species Act, as amended, except that such use must be consistent with the Tahoe-Prosser Exchange Agreement, the Preliminary Settlement Agreement as modified by the Ratification Agreement, the Operating Agreement, and the mitigation agreement specified in subparagraph 205(a)(1)(C) of this title

(3) Nothing in this subsection shall prevent exchanges of such water or the use of the water stored in or released from these reservoirs for coordinated non-consumptive purposes, including recreation, instream beneficial uses, and generation of hydro-electric power Subject to the Secretary's obligations to use water for the Pyramid Lake fishery, the Secretary is authorized to use storage capacity in the Truckee River reservoirs, including Stampede and Prosser Creek reservoirs, for storage of non-project water, including, but not limited to, storage of California's Truckee River basin surface water allocation, through negotiation of appropriate provisions for storage of such water in the Operating Agreement. To the extent it is not necessary for the Pyramid Lake fishery, the Secretary may allow Truckee River reservoir capacity dedicated to Washoe Project water to be used for exchanges of water or water rights, and to enable conjunctive use In carrying out the provisions of this subsection, the Secretary shall comply with all applicable provisions of State law

(e) OFFSETTING FLOWS.--Additional flows in the Truckee River and to Pyramid Lake resulting from the implementation of subsection 206(c) of this title are intended to offset any reductions in those flows which may be attributable to the allocations to California or Nevada under section 204 of this title or to the waivers in sections 3 and 21 of article II of the Preliminary Settlement Agreement as modified by the Ratification Agreement

SEC. 208. PYRAMID LAKE FISHERIES AND DEVELOPMENT FUNDS.

(a) FUNDS ESTABLISHED.--

(1) There are hereby established within the Treasury of the United States the "Pyramid Lake Paiute Fisheries Fund" and "Pyramid Lake Paiute Economic Development Fund" .

(2) There is authorized to be appropriated to the Pyramid Lake Paiute Fisheries Fund $25,000,000.

(A) The principal of the Pyramid Lake Paiute Fisheries Fund shall be unavailable for withdrawal.

(B) Interest earned on the Pyramid Lake Paiute Fisheries Fund shall be available to the Pyramid Lake Tribe only for the purposes of operation and maintenance of fishery facilities at Pyramid Lake, excluding Marble Bluff Dam and Fishway, and for conservation of the Pyramid Lake fishery in accordance with plans prepared by the Pyramid Lake Tribe in consultation with and the concurrence of the United States Fish and Wildlife Service and approved by the Secretary Of interest earned annually on the principal, 25 percent per year, or an amount which, in the sole judgment of the Secretary of the Treasury, is sufficient to maintain the principal of the fund at $25,000,000 in 1990 constant dollars, whichever is less, shall be retained in the fund as principal and shall not be available for withdrawal. Deposits of earned interest in excess of that amount may be made at the discretion of the Pyramid Lake Tribe, and all such deposits and associated interest shall be available for withdrawal

(C) All sums deposited in, accruing to, and remaining in the Pyramid Lake Paiute Fishery Fund shall be invested by the Secretary and the Secretary of the Treasury in interest-bearing deposits and securities in accordance with the Act of June 24, 1938, 52 Stat 1037 Interest earnings not expended, added to principal, or obligated by the Pyramid Lake Tribe in the year in which such earnings accrue to the fund or in the four years that immediately follow shall be credited to the fund established under subsection 206(f) of this title

(D) Subject to subparagraph (E) of this paragraph, the Secretary and the Secretary of the Treasury shall allocate and make available to the Pyramid Lake Tribe such eligible moneys from the Pyramid Lake Fishery Fund as are requested by the Pyramid Lake Tribe to carry out plans developed under subparagraph (B) of this paragraph.

(E) The Secretary and the Secretary of the Treasury shall not disburse moneys from the Pyramid Lake Paiute Fishery Fund until such time as the following conditions have been met

(i) The Pyramid Lake Tribe has released any and all claims of any kind whatsoever against the United States for damages to the Pyramid Lake fishery resulting from the Secretary's acts or omissions prior to the date of enactment of this title; and

(ii) The Pyramid Lake Tribe has assumed financial responsibility for operation and maintenance of the fishery facilities located at Pyramid Lake for the benefit of the Pyramid Lake fishery, excluding the Marble Bluff Dam and Fishway

(3) There is authorized to be appropriated to the Pyramid Lake Paiute Economic Development Fund $40,000,000 in five equal annual installments in the 1993, 1994, 1995, 1996, and 1997 fiscal years.

(A) The principal and interest of the Pyramid Lake Paiute Economic Development Fund shall be available for tribal economic development only in accordance with a plan developed by the Pyramid Lake Tribe in consultation with the Secretary. The objectives of the plan shall be to develop long- term, profit-making opportunities for the Pyramid Lake Tribe and its members, to create optimum employment opportunities for tribal members, and to establish a high quality recreation area at Pyramid Lake using the unique natural and cultural resources of the Pyramid Lake Indian Reservation The plan shall be consistent with the fishery restoration goals of section 207 of this title. The plan may be revised and updated by the Pyramid Lake Tribe in consultation with the Secretary.

(B) The Pyramid Lake Tribe shall have complete discretion to invest and manage the Pyramid Lake Paiute Economic Development Fund, except that no portion of the principal shall be used to develop, operate, or finance any form of gaming or gambling, except as may be provided by the Indian Gaming Regulatory Act, Public Law 100-497 (102 Stat 2467), and the United States shall not bear any obligation or liability regarding the investment, management, or use of such funds that the Pyramid Lake Tribe chooses to invest, manage, or use.

(C) If the Pyramid Lake Tribe so requests, all sums deposited in, accruing to, and remaining in the Pyramid Lake Paiute Economic Development Fund shall be invested by the Secretary and the Secretary of the Treasury in interest- bearing deposits and securities in accordance with the Act of June 24, 1938, 52 Stat. 1037. All such interest shall be added to the Pyramid Lake Paiute Economic Development Fund.

(D) The Secretary and the Secretary of the Treasury shall allocate and make available to the Pyramid Lake Tribe such moneys from the Pyramid Lake Economic Development Fund as are requested by the Pyramid Lake Tribe, except that no disbursements shall be made to the Pyramid Lake Tribe unless and until the Pyramid Lake Tribe adopts and submits to the Secretary the economic development plan described in subparagraph (A) of this paragraph, and section 204, the Preliminary Settlement Agreement as modified by the Ratification Agreement, and the Operating Agreement enter into effect in accordance with the terms of subsection 210(a) of this title

(4) Under no circumstances shall any part of the principal of the funds established under this section be distributed to members of the Pyramid Lake Tribe on a per capita basis

(5) If, and to the extent that any portion of the sum authorized to be appropriated in paragraph 208(a)(2) is appropriated after fiscal year 1992, or in a lesser amount, there shall be deposited in the Pyramid Lake Paiute Fisheries Fund, subject to appropriations, in addition to the full contribution to the Pyramid Lake Paiute Fisheries Fund, an adjustment representing the interest income as determined by the Secretary in his sole discretion that would have been earned on any unpaid amount had the amount authorized in paragraph 208(a)(2) been appropriated in full for fiscal year 1992

(6) If and to the extent that any portion of the sums authorized to be appropriated in paragraph 208(a)(3) are appropriated after fiscal years 1993, 1994, 1995, 1996, and 1997, or in lesser amounts than provided by paragraph 208(a)(3), there shall be deposited in the Pyramid Lake Paiute Economic Development Fund, subject to appropriations, in addition to the full contributions to the Pyramid Lake Paiute Economic Development Fund, an adjustment representing the interest income as determined by the Secretary in his sole discretion that would have been earned on any unpaid amounts had the amounts authorized in paragraph 208(a)(3) been appropriated in full for fiscal years 1993, 1994, 1995, 1996, and 1997.

SEC 209. NEWLANDS PROJECT IMPROVEMENT

(a) EXPANSION OF AUTHORIZED PURPOSES.--

(1) In addition to the existing irrigation purpose of the Newlands Reclamation Project, the Secretary is authorized to operate and maintain the project for the purposes of

(A) fish and wildlife, including endangered and threatened species;

(B) municipal and industrial water supply in Lyon and Churchill counties, Nevada, including the Fallon Indian Reservation;

(C) recreation,

(D) water quality; and

(E) any other purposes recognized as beneficial under the law of the State of Nevada.

(2) Additional uses of the Newlands Project made pursuant to this section shall have valid water rights and, if transferred, shall be transferred in accordance with State law.

(b) TRUCKEE RIVER DIVERSIONS.--The Secretary shall not implement any provision of this title in a manner that would:

(1) increase diversions of Truckee River water to the Newlands Project over those allowed under applicable operating criteria and procedures; or

(2) conflict with applicable court decrees.

(c) PROJECT EFFICIENCY STUDY.--

(1) The Secretary shall study the feasibility of improving the conveyance efficiency of Newlands Project facilities to the extent that, within twelve years after the date of enactment of this title, on average not less than seventy-five percent of actual diversions under applicable operating criteria and procedures shall be delivered to satisfy the exercise of water rights within the Newlands Project for authorized project purposes.

(2) The Secretary shall consider the effects of the measures required to achieve such efficiency on groundwater resources and wetlands in the Newlands Project area. The Secretary shall report the results of such study to the Committees on Energy and Natural Resources, Environment and Public Works, and Appropriations of the Senate and the Committees on Interior and Insular Affairs, Merchant Marine and Fisheries, and Appropriations of the House of Representatives not later than three years after the date of enactment of this title.

(d) WATER BANK.--The Secretary, in consultation with the State of Nevada and the operator of the Newlands Project, is authorized to use and enter into agreements to allow water right holders to use Newlands Project facilities in Nevada, where such facilities are not otherwise committed or required to fulfill project purposes or other Federal obligations, for supplying carryover storage of irrigation and other water for drought protection and other purposes, consistent with subsections (a) and (b) of this section The use of such water shall be consistent with and subject to applicable State laws

(e) RECREATION STUDY.--The Secretary, in consultation with the State of Nevada, is authorized to conduct a study to identify administrative, operational, and structural measures to benefit recreational use of Lahontan Reservoir and the Carson River downstream of Lahontan Dam. Such study shall be reported to the Committee on Energy and Natural Resources of the Senate and the Committee on Interior and Insular Affairs of the House of Representatives.

(f) EFFLUENT REUSE STUDY --The Secretary, in cooperation with the Administrator of the Environmental Protection Agency, the State of Nevada, and

appropriate local entities, shall study the feasibility of reusing municipal wastewater for the purpose of wetland improvement or creation, or other beneficial purposes, in the areas of Fernley, Nevada, the former Lake Winnemucca National Wildlife Refuge, and the Lahontan Valley. The Secretary shall coordinate such studies with other efforts underway to manage wastewater from the Reno and Sparks, Nevada, area and to improve Truckee River and Pyramid Lake water quality Such study shall be reported to the Committees on Energy and Natural Resources, Environment and Public Works, and Appropriations of the Senate and the Committees on Interior and Insular Affairs, Merchant Marine and Fisheries, and Appropriations of the House of Representatives.

(g) REPAYMENT CANCELLATION.--Notwithstanding any other provision of law, the Secretary may cancel all repayment obligations owing to the Bureau of Reclamation by the Truckee-Carson Irrigation District. As a precondition for the Secretary to cancel such obligations, the Truckee-Carson Irrigation District shall agree to collect all such repayment obligations and use such funds for water conservation measures. For the purpose of this subsection and paragraph 209(h)(2), the term "water conservation measures" shall not include repair, modification, or replacement of Derby Dam.

(h) SETTLEMENT OF CLAIMS --

(1) The provisions of subsections 209(d), (e), (f), and (g) of this section shall not become effective unless and until the Truckee-Carson Irrigation District has entered into a settlement agreement with the Secretary concerning claims for recoupment of water diverted in excess of the amounts permitted by applicable operating criteria and procedures

(2) The provisions of subsection 209(g) of this section shall not become effective unless and until the State of Nevada provides not less than $4,000,000 for use in implementing water conservation measures pursuant to the settlement described in paragraph (1) of this subsection.

(3) The Secretary is authorized to expend such sums as may be required to match equally the sums provided by the State of Nevada under paragraph (2) of this subsection. Such sums shall be available for use only in implementing water conservation measures pursuant to the settlement described in paragraph (1) of this subsection.

(i) FISH AND WILDLIFE.--The Secretary shall, insofar as is consistent with project irrigation purposes and applicable operating criteria and procedures, manage existing Newlands Project re-regulatory reservoirs for the purpose of fish and wildlife.

(j) OPERATING CRITERIA AND PROCEDURES.--

(1) In carrying out the provisions of this title, the Secretary shall act in a manner that is fully consistent with the decision in the case of *Pyramid Lake Paiute Tribe of Indians* v. *Morton*, 354 F Supp. 252 (D.D.C.1973).

(2) Notwithstanding any other provision of law, the operating criteria and procedures for the Newlands Reclamation Project adopted by the Secretary on April 15, 1988 shall remain in effect at least through December 31, 1997, unless the Secretary decides, in his sole discretion, that changes are necessary to comply with his obligations, including those under the Endangered Species Act, as amended Prior to December 31, 1997, no court or administrative tribunal shall have jurisdiction to set aside any of such operating criteria and procedures or to order or direct that they be changed in any way. All actions taken heretofore by the Secretary under any operating criteria and procedures are hereby declared to be valid and shall not be subject to review in any judicial or administrative proceeding, except as set forth in paragraph (3) of this subsection.

(3) The Secretary shall henceforth ensure compliance with all of the provisions of the operating criteria and procedures referenced in paragraph (2) of this subsection or any applicable provision of any other operating criteria or procedures for the Newlands Project previously adopted by the Secretary, and shall, pursuant to subsection 709(h) or judicial proceeding, pursue recoupment of any water diverted from the Truckee River in excess of the amounts permitted by any such operating criteria and procedures. The Secretary shall have exclusive authority and responsibility to pursue such recoupment, except that, if an agreement or order leading to such recoupment is not in effect as of December 31, 1997, any party with standing to pursue such recoupment prior to enactment of this title may pursue such recoupment thereafter. Any agreement or court order between the Secretary and other parties concerning recoupment of Truckee River water diverted in violation of applicable operating criteria and procedures shall be consistent with the requirements of this subsection and the Endangered Species Act, as amended, and shall be submitted for the review and approval of the court exercising jurisdiction over the operating criteria and procedures for the Newlands Project All interested parties may participate in such review. In any recoupment action brought by any party, other than the Secretary, after December 31, 1997, the only relief available from any court of the United States will be the issuance of a declaratory judgment and injunctive relief directing any unlawful user of water to restore the amount of water unlawfully diverted. In no event shall a court enter any order in such a proceeding that will result in the expenditure of any funds out of the United States Treasury.

SEC. 210. MISCELLANEOUS PROVISIONS.

(a) CLAIMS SETTLEMENT.--

(1) The effectiveness of section 204 of this title, the Preliminary Settlement Agreement as modified by the Ratification Agreement, the Operating Agreement, and the Secretary's authority to disburse funds under paragraph 208(a)(3) of this title are contingent upon dismissal with prejudice or other final resolution, with respect to the parties to the Preliminary Settlement Agreement as modified by the Ratification Agreement and the State of Nevada and the State of California, of the following outstanding litigation and proceedings:

(A) *Pyramid Lake Paiute Tribe* v. *California*, Civ. S-181-378-RAR-RCB, United States District Court, Eastern District of California;

(B) *United States* v. *Truckee-Carson Irrigation District*, Civ. No. R-2987- RCB, United States District Court, District of Nevada;

(C) *Pyramid Lake Paiute Tribe* v. *Lujan*, Civ. S-87-1281-LKK, United States District Court, Eastern District of California;

(D) *Pyramid Lake Paiute Tribe* v. *Department of the Navy*, Civ No. R-86-115- BRT in the United States District Court, District of Nevada and Docket No 88-1650 in the United States Court of Appeals for the Ninth Circuit; and

(E) All pending motions filed by the Tribe in Docket No. E-9530 before the Federal Energy Regulatory Commission.

(2) In addition to any other conditions on the effectiveness of this title set forth in this title, the provisions of:

(A) section 204, subsections 206(c), 207(c) and (d), subparagraph 208(a)(3)(D), and paragraph 210(a)(3) of this title shall not take effect until:

(i) the agreements and regulations required under section 205 of this title, including the Truckee Meadows water conservation plan referenced in the Preliminary Settlement Agreement as modified by the Ratification Agreement, enter into effect,

(ii) the outstanding claims described in paragraph 210(a)(1) have been dismissed with prejudice or otherwise finally resolved;

(B) section 204 of this title, the Preliminary Settlement Agreement as modified by the Ratification Agreement, and the Operating Agreement, shall not take effect until the Pyramid Lake Tribe's claim to the remaining waters of the Truckee River which are not subject to vested or perfected rights has been finally resolved in a manner satisfactory to the State of Nevada and the Pyramid Lake Tribe; and

(C) section 204 of this title, the Preliminary Settlement Agreement as modified by the Ratification Agreement, the Operating Agreement, and subsection 207(d) shall not take effect until the funds authorized in paragraph 208(a)(3) of this title have been appropriated.

(3) On and after the effective date of section 204 of this title, except as otherwise specifically provided herein, no person or entity who has entered into the Preliminary Settlement Agreement as modified by the Ratification Agreement or the Operating Agreement, or accepted any benefits or payments under this legislation, including any Indian Tribe and the States of California and Nevada, the United States and its officers and agencies may assert in any judicial or administrative proceeding a claim that is inconsistent with the allocations provided in section 204 of this title, or inconsistent or in conflict with the operational criteria for the Truckee River established pursuant to section 205 of this title No person or entity who does not become a party to the Preliminary Settlement Agreement as modified by the Ratification Agreement or the Operating Agreement may assert in any judicial or administrative proceeding any claim for water or water rights for the Pyramid Lake Tribe, the Pyramid Lake Indian Reservation, or the Pyramid Lake fishery Any such claims are hereby barred and extinguished and no court of the United States may hear or consider any such claims by such persons or entities

(b) GENERAL PROVISIONS --

(1) Subject to the provisions of paragraphs (2) and (3) of this subsection, and to all existing property rights or interests, all of the trust land within the exterior boundaries of the Pyramid Lake Indian Reservation shall be permanently held by the United States for the sole use and benefit of the Pyramid Lake Tribe.

(2) Anaho Island in its entirety is hereby recognized as part of the Pyramid Lake Indian Reservation In recognition of the consent of the Pyramid Lake Tribe evidenced by Resolution No. 19-90 of the Pyramid Lake Paiute Tribal Council, all of Anaho Island shall hereafter be managed and administered by and under the primary jurisdiction of the United States Fish and Wildlife Service as an integral component of the National Wildlife Refuge System for the benefit and protection of colonial nesting species and other migratory birds Anaho Island National Wildlife Refuge shall be managed by the United States Fish and Wildlife Service in accord with the National Wildlife Refuge System Administration Act, as amended, and other applicable provisions of Federal law Consistent with the National Wildlife Refuge System Administration Act, as amended, the Director of the United States Fish and Wildlife Service is authorized to enter into cooperative agreements with the Pyramid Lake Tribe regarding Anaho Island National Wildlife Refuge

(3) Subject to the relinquishment by the legislature of the State of Nevada of any claim the State of Nevada may have to ownership of the beds and banks of the Truckee River within the exterior boundaries of the Pyramid Lake Indian Reservation and of Pyramid Lake, those beds and banks are recognized as part of the Pyramid Lake Indian Reservation and as being held by the United States in trust for the sole use and benefit of the Pyramid Lake Tribe. Nothing in this subsection shall be deemed to recognize any right, title, or interest of the State of Nevada in those beds and banks which it would not otherwise have No other provision of this title shall be contingent on the effectiveness of this subsection

(4) Except as provided in paragraphs (2) and (9) of this subsection, the Pyramid Lake Tribe shall have the sole and exclusive authority to establish rules and regulations governing hunting, fishing, boating, and all forms of water based recreation on all lands within the Pyramid Lake Indian Reservation except fee-patented land, provided that the regulation of such activities on fee-patented land within the Pyramid Lake Indian Reservation shall not be affected by this paragraph. Nothing in this paragraph shall be deemed to recognize or confer any criminal jurisdiction on the Pyramid Lake Tribe or to affect any regulatory jurisdiction of the State of Nevada with respect to any other matters.

(5) The consent of the United States is given to the negotiation and execution of an intergovernmental agreement between the Pyramid Lake Tribe and the State of Nevada, which agreement may also include Washoe County, Nevada, providing for the enforcement by the State of Nevada and Washoe County of the rules and regulations referred to in paragraph (4) adopted by the Pyramid Lake Tribe governing hunting, fishing, boating, and all forms of water based recreation against non-members of the Pyramid Lake Tribe and for State courts or other forums of the State of Nevada or its political subdivisions to exercise civil and criminal jurisdiction over violations of the Pyramid Lake Tribe's rules and regulations allegedly committed by such non-members, except as provided by paragraphs (2) and (9) of this subsection

(6) The consent of the United States is given to the negotiation and execution of an intergovernmental agreement between the Pyramid Lake Tribe and the State of Nevada, which agreement may also include Washoe County, Nevada, providing for the enforcement of rules and regulations governing hunting, fishing, boating and all forms of water based recreation on fee-patented land within the Pyramid Lake Indian Reservation, except as provided by paragraphs (2) and (9) of this subsection.

(7) Nothing in this title shall limit or diminish the Federal Government's trust responsibility to any Indian Tribe, except that this provision shall not be interpreted to impose any liability on the United States or its agencies for any damages resulting from actions taken by the Pyramid Lake Paiute Tribe as to which the United States is not a party or with respect to which the United States has no supervisory responsibility

(8) Subject to the terms, conditions, and contingencies of and relating to the Preliminary Settlement Agreement as modified by the Ratification Agreement, the United States on its own behalf and in its capacity as trustee to the Pyramid Lake Tribe confirms and ratifies the waivers of any right to object to the use and implementation of the water supply measures described in sections 3 and 21 of article II of the Preliminary Settlement Agreement as modified by the Ratification Agreement, and any waivers of sovereign immunity given in connection with that agreement or the Operating Agreement, upon the entry into effect of the Preliminary Settlement Agreement as modified by the Ratification Agreement

(9) Nothing in this title shall be construed as waiving or altering the requirements of any Federal environmental or wildlife conservation law, including, but not limited to, the Endangered Species Act, as amended, including the consultation and reinitiation of consultation responsibilities of the Secretary under section 7 of the Act, and the National Environmental Policy Act of 1969.

(10) Nothing in this title shall be construed to create an express or implied Federal reserved water right.

(11) Nothing in this title shall subject the United States or any of its agencies or instrumentalities or any Indian Tribe to any State jurisdiction or regulation to which they would not otherwise be subject.

(12) Nothing in this title is intended to abrogate the jurisdiction of or required approvals by the Nevada State Engineer or the California State Water Resources Control Board

(13) Nothing in this title is intended to affect the power of the *Orr Ditch* court or the *Alpine* court to ensure that the owners of vested and perfected Truckee River water rights receive the amount of water to which they are entitled under the *Orr Ditch* decree or the *Alpine* decree. Nothing in this title is intended to alter or conflict with any vested and perfected right of any person or entity to use the water of the Truckee River or its tributaries, including, but not limited to, the rights of landowners within the Newlands Project for delivery of the water of the Truckee River to Derby Dam and for the diversion of such waters at Derby Dam pursuant to the *Orr Ditch* decree or any applicable law.

(14) No single provision or combination of provisions in this title, including interstate allocations under section 204, or associated agreements which may adversely affect inflows of water to Pyramid Lake shall form the basis for additional claims of water to benefit Pyramid Lake, the Pyramid Lake fishery, or lands within the Pyramid Lake Indian Reservation

(15) Nothing in this title shall affect any claim of Federal reserved water rights, if any, to the Carson River or its tributaries for the benefit of lands within the Fallon Indian Reservation

(16) The Secretary, in consultation with the State of Nevada and affected local interests, shall undertake appropriate measures to address significant adverse impacts, identified by studies authorized by this title, on domestic uses of groundwater directly resulting from the water purchases authorized by this title.

(17) It is hereby declared that after August 26, 1935, and prior to the date of enactment of this title, there was no construction within the meaning of section 23(b) of the Federal Power Act, as amended, at the four run-of-river hydroelectric project works owned by Sierra Pacific Power Company and located on the Truckee River. Notwithstanding any other provision of law, after the date of enactment of this title, development of additional generating capacity at such project works that is accomplished through replacement of turbine generators and increases in effective head shall not constitute construction within the meaning of section 23(b) of the Federal Power Act, as amended: Provided, That such development may not change the location of or increase any existing impoundments and may not require diversions of water in excess of existing water rights for such project works: And provided further, That the diversions of water for the operation of such project works shall be consistent with the Preliminary Settlement Agreement as modified by the Ratification Agreement, and the Operating Agreement. The Secretary shall take into account the monetary value of this provision to the Sierra Pacific Power Company in calculating the storage charge referred to in paragraph 205(a)(6)

(18) The Secretary is authorized, in accordance with this section and applicable provisions of existing law, to exchange surveyed public lands in Nevada for interests in fee patented lands, water rights, or surface rights to lands within or contiguous to the exterior boundaries of the Pyramid Lake Indian Reservation. The values of the lands or interests therein exchanged by the Secretary under this paragraph shall be substantially equal, but the Secretary is authorized to accept monetary payments from the owners of such fee patented lands, water rights, or surface rights as circumstances may require in order to compensate for any difference in value Any such payments shall be deposited to the Treasury. The value of improvements on land to be exchanged shall be given due consideration and an appropriate allowance shall be made therefor in the valuation. Title to lands or any interest therein acquired by the Secretary pursuant to this subsection shall be taken in the name of the United States in trust for the Pyramid Lake Tribe and shall be added to the Pyramid Lake Indian Reservation

(c) APPROPRIATIONS AUTHORIZED.--There are authorized to be appropriated such sums as may be required to implement the provisions of this title.

Appendix 2

EXCERPTS FROM THE ALPINE DECREE

This appendix contains the decree's findings of fact, conclusions of law, and administrative provisions. The remainder of the decree -- the tabulation of individual water rights -- has not been included here because it is too lengthy and subject to frequent revision as water rights change ownership. Persons interested in the status of individual rights should contact the court or the watermaster for the most up-to-date information.

Readers of the material included here should be aware that some of the language in the decree dates back to much earlier legal actions and does not reflect modern social values. Because the Alpine Decree is an important adjudication of water rights on the Carson River, the excerpt from the decree is a useful reference for inclusion in this publication. The excerpt is a direct quotation; as such, the language cannot be modified in reprinting the excerpt here. The Department of Water Resources does not condone the use of phrases in the decree that are clearly discriminatory and offensive by today's standards.

I This Court has jurisdiction over the subject matter and the parties to this proceeding

II The Carson River and its tributaries are interstate streams and the waters of the Carson River and its tributaries are fully appropriated

III Under the Reclamation Act of June 17, 1902, the United States, acting by the Secretary of the Interior, on July 2, 1902, withdrew from public entry, excepting under the homestead laws in accordance with the provisions of the Act, the lands required for the government's first reclamation project, now known as the Newlands Project.

IV The United States has diligently proceeded with the construction of the Newlands Project and has expended over Six Million Dollars ($6,000,000) in that construction The works so constructed have been used for many years, for the storage of Carson River water and the distribution thereof to Project lands. The principal structure of the Project is the Lahontan Reservoir which was completed at a cost of approximately One Million Four Hundred Thousand Dollars ($1,400,000). Lahontan Reservoir has a capacity of 295,149 acre-feet to the spillway crest With 20 inch flashboards on the crest, the capacity is 317,280 acre-feet The lands of the Newlands Project irrigated or susceptible of irrigation by the waters of the Carson River and its tributaries include 80,000 acres of cultivable lands, 50,000 acres of pasture lands, and 7,500 acres of land in the Truckee Division of the Project

V There existed prior to July 2, 1902 certain vested rights, owned by old-time settlers in Churchill County, in and to the use of waters of the Carson River and its tributaries The United States, subsequent to July 2, 1902, acquired the right, title and interest of these owners in the waters, ditches, dams, and other irrigation facilities and structures and in return agreed to construct water storage and distribution facilities and to deliver certain waters to these owners

VI Prior to July 2, 1902, there existed under the ownership of Frank W. Inman and his wife the right to divert 40 c.f.s of water of the Carson River with a priority of 1882 for the purpose of producing power On February 12, 1912, Frank W. Inman and his wife executed an agreement conveying this power right to the United States.

VII. The United States possesses Trust Patents to five riparian rights on the West and East Forks of the Carson River in Alpine County, California, in favor of the following five beneficiary Indians of the Washoe Tribe, in the acreage as specified.

Name	Acreage
Dr Bob	1 40
Hattie Miller (Cow Bitch)	19 73
Molly's Pete	16 40
Maggie James	4 40
GO-DAH-DIC-PETE	8.25

VIII The lands on which the waters of the Carson River and its tributaries are used lie in an arid region of the United States, to make these lands productive, irrigation thereof is necessary, these lands vary widely in texture, porosity, terrain, inclination, vegetation, crop use, sub-surface stratas and other factors which affect the amount of water necessary to irrigate different portions of said lands and further affect the amount of water which is returned to the main course by drainage and other means; the various areas require, for proper irrigation and crop productivity varying quantities of water per acre In the Newlands Project, the water duties are 3.5 acre-feet per acre delivered to the land for the bottom-land and 4 5 acre-feet per acre delivered to the land for the bench land In the lands above the Newlands Project the water duties are 4.5 acre-feet per acre diverted to the canal for the bottom-lands, 6.0 acre-feet per acre diverted to the canal for the alluvial fan lands and 9.0 acre-feet per acre diverted to the canal for the bench lands The water duties assigned for the various categories of the land are the total duties from whatever source of surface water

The net consumptive use of surface water for irrigation on the Newlands Project is 2 99 acre-feet per acre The net consumptive use of surface water for irrigation of the lands above the Lahontan Reservoir is 2.5 acre-feet per acre

IX. The Carson River and its tributaries are divided into eight segments

Segment 1: The East Fork of the Carson River from the California/Nevada state line up to the headwaters of the East Fork in the mountains.

Segment 2. The East Fork of the Carson River from the California/Nevada state line to the confluence of the East and West Forks of the Carson River.

Segment 3· The West Fork of the Carson River from the gauge at Woodfords, California upstream to the headwaters in the mountains.

Segment 4: The West Fork of the Carson River from the gauge at Woodfords to the California/Nevada State line.

Segment 5: The West Fork of the Carson River (and Brockliss Slough) between the California/Nevada state line and the confluence of the East and West Forks of the Carson River

Segment 6. The main stream of the Carson River from the confluence of the East Fork, West Fork and Brockliss Slough to the gauge at Carson City

Segment 7: The main stream of the Carson from the Carson City gauge to Lahontan reservoir This segment is further subdivided for administration into autonomous subsegments

(a) Mexican Ditch, Dayton and the reach between Rose Ditch and Cardelli Ditch, inclusive,

(b) Gee Ditch;

(c) Koch Ditch,

(d) Houghman and Howard Ditches;

(e) Buckland Ditch.

Segment 8. The area below the Lahontan Dam.

X. The historic practices, customs, agreements and decrees followed by the water users and the Federal Water Master on the Carson River and its tributaries

1 General.

(a) The Watermaster shall begin to direct the distribution of water on such date that he determines there is not enough water in the Upper Carson River to serve the most junior priority

(b) When such distribution begins, the water users are notified that the river is on regulation and diversions will be monitored.

(c) Subject to the exceptions described below, the water is distributed on the basis of priority and acreage.

(d) For purposes of distribution, the river is administered in segments in accordance with established practices, customs, agreements and decrees.

(e) When the river is on regulation each segment of the river is treated autonomously

(f) The high alpine reservoirs on both forks of the river are filled out of the priority order This is done because the snow does not melt sufficiently at those high elevations to fill the reservoirs until the summer when the river flow has already begun to diminish down in the valley.

(g) On all segments of the river, rotation is practiced so as to serve the junior priorities as long as possible.

(h) On both the East Fork and the West Fork, any user, regardless of his priority, who does not need the water does not get it If the user has a need for it, he gets the water under his priority; if he does not have a need for it, the water goes to the next junior priority.

2. Segment 1:

Since this segment consists largely of riparian lands, there are no relevant customs and the Water Master exercises little supervision except to regulate the release of water from the Alpine Land and Reservoir reservoirs. Water in these reservoirs is represented by corporate stock and is rented, traded and sold to any landowner.

3 Segment 2·

(a) When the flow rate at the Gardnerville gauge reduces to 200 cubic feet per second, 1/3 of the river flow is directed into the Allerman Canal and 2/3 of the flow stays in the river. The point of measurement for the 1/3-2/3 split is at a weir located 100 feet downstream of the intersection of Highway 395 and the Allerman Canal Water users on the Heybourne Tract served by the Allerman Canal, the upper New Virginia, Company and Cottonwood ditches hire a ditch rider to assist, under the direction of the Water Master, in the distribution of water.

(b) Reservoirs 1, 2 and 4 on the Dangberg lands are filled 3 times yearly The reservoirs are filled once in February and March pursuant to their storage rights. The reservoirs are filled twice later in the year as a means of regulating the water flow in the Virginia and Allerman ditches and ensuring sufficient irrigation head during periods of peak irrigation demand.

(c) Most diversions in this and the other segments are based upon a two-week irrigation interval. The smaller canals such as the Peter Heitman, Berning, Christensen-Hussman, Madison or Topping No. 1 and Topping No. 2 divert for several days on a two-week interval. Other larger canals and sloughs divert on a continuous basis and individual ditches and laterals coming off these larger canals will be on the two-week rotation. Canals and sloughs that divert continuously are the Allerman Canal, Upper New Virginia, Rocky Slough, Henningsen System, Stodieck, St. Louis Straight, Homestream, Company, Cottonwood and Williams Slough.

The continuous diversion made by the St. Louis Straight and island portion of Homestream will be stopped and transferred to the Allerman Canal when the 1/3-2/3 split takes place

(d) When the East Fork goes on regulation, the Cottonwood Slough is used to convey water downstream to the Williams Slough diversion rather than using the main channel of the East Fork.

4. Segment 3:

This segment on the West Fork consists largely of riparian lands and the Water Master exercises little supervision except to regulate the release of water from the mountain reservoirs for downstream use. Traditionally the water stored in the mountain reservoirs has not been considered appurtenant to any particular place of use.

5 Segment 4

(a) The Anderson-Bassman Decree, Exhibit 16, provides that beginning the first Monday in June and continuing to the end of the irrigation season the available water supply is rotated on a weekly basis between Segment 4 and Segment 5. This custom applies to all

water users on these two segments, not just the original parties to the Anderson-Bassman lawsuit or their successors in interest.

(b) The Price Decree, Exhibit 18, and the 1941 Agreement, Exhibit 19, control the rotation among the Segment 4 users during the week that Segment 4 has water under the Anderson-Bassman Decree.

(c) During the non-irrigation season, diversions are made by the Snowshoe Thompson No. 2 ditch via Indian Creek to store water in the Mud Lake Reservoir.

6. Segment 5·

(a) As mentioned above, this segment's diversions are made according to the weekly rotation schedule with Segment 4 after the first Monday in June.

(b) During Segment 5 week the water is allocated according to priorities. During Segment 4 week, any Segment 5 junior appropriators who did not get direct flows during Segment 5 week are allowed to use the return flows from Segment 4.

(c) The Dresslers usually bring their alpine stored waters down during Segment 5 week but Bruns and Gansberg usually bring their Lost Lake water down during Segment 4 week.

(d) The water stored in Mud Lake Reservoir is sometimes released to downstream users in exchange for direct diversion that would normally go to those downstream users

(e) Brockliss Slough, starting in the vicinity of Dressler Lane, carries West Fork water drainage down to the confluence of Brockliss Slough and the East and West Forks. During times of short supply in Brockliss Slough, the use of water is rotated among the three oldest priorities, a second rotation is observed among the other priorities.

(f) Drainage water is occasionally diverted from the old West Fork into Brockliss Slough and then to lands west of Brockliss Slough.

(g) Due to the destruction of the Jones Company West ditch by flood, the lands formerly irrigated from that ditch are now served with return waters from Bull Slough. Bull Slough also receives return flows from irrigation using mountain creeks not considered tributaries of the Carson

(h) Some rights which appear to be served with West Fork water are actually served with East Fork water which, after being used to irrigate East Fork lands, drains into the West Fork channel. These lands are generally those in between Squires Ditch and the Muller-Bartels dam on the West Fork

(i) Water taken out of the East Fork through Rocky Slough and into Edna Ditch and other small ditches is used to irrigate lands between the East Fork and the West Fork.

7 Segment 6·

The diversions in this segment occur by pumping from the river When the main stream is on regulation, the amount of water that gets to each pump is sufficient to satisfy that priority. As a result, and because of the high cost of regulation in comparison to benefits, the Water Master makes no attempt to regulate in this segment unless a controversy arises.

8. Segment 7

Due to the intermittent nature of the river's surface flow, appearing upstream and disappearing downstream from various diversion structures, this segment is regulated in autonomous sub-segments

9. Segment 8

There are no relevant practices or customs in this segment and the Water Master only regulates when a controversy arises

XI. The California riparian landowners are entitled to the riparian water rights permitted under California law.

XII. For proper administration of the respective rights of the parties in this action, it is necessary and proper that general administrative provisions be incorporated in this Decree and that a Water Master be appointed to carry out the provisions of the Decree

XIII. The parties, persons, corporations, intervenors, grantees and substituted parties named in the following tabulation, and their successors-in-interest and assigns, constitute and are the only appropriators, riparian owners and users of the waters of the Carson River and its tributaries. The sole class of exceptions to the foregoing statement is the landowners on the Newlands Project who took land patents from the United States Each such landowner is the owner of an appurtenant water right for the patented land as discussed in the opinion filed in this case. The Court has not been provided with a tabulation of these owners and their irrigated acreages. As to the future tabulation of these details, see Administrative Provision VI. All of the above-mentioned parties and their successors and assigns are the owners of water rights to the waters of the Carson River and its tributaries for the legally described acreages or places of use and with the listed priority dates, all contained in the following tabulation.

CONCLUSIONS OF LAW

I The parties hereto are entitled to a Decree in this action adjudging and declaring that they are the owners and entitled to use the rights set forth in the following tabulation.

II In accordance with the Findings of Fact and Conclusions of Law, IT HEREBY IS ORDERED, ADJUDGED AND DECREED as follows

That the parties, intervenors, grantees, successors in interest and assigns are, and each of them hereby is, as against every party to this action, adjudged to be the owners of the water rights hereafter specified and set forth and entitled to divert, store and use from the Carson River and its tributaries and from the streams and springs hereafter mentioned, and by and through their respective ditches, canals, flumes, dams and reservoirs for the irrigation of their respective lands as described in the tabulation, for generating power, for municipal purposes, for supplying the people living in cities and towns, for reclamation of arid lands, for watering livestock, for domestic uses and other beneficial purposes, water in the amounts discussed in the previous sections on water duty, subject and according to the respective priority dates and riparian ownership stated below and the historic customs, practices, agreements and decrees discussed above

All points of diversion and places of use are described with reference to the Mount Diablo Base and Meridian Where an entity owns multiple water rights, that entity is listed at the beginning of a series of water rights from a particular diversion ditch and is not repeated for each place of use Similarly, if a series of places of use under the same owner all have the same priority date, that date is listed once on the first line of the series and is not repeated for each place of use. The only exception to this system is the tabulation of the water rights in Segment 4, where the Special Master listed the places of use for each owner and then gave total acreages for the relevant priority dates. The listing of owners is correct only insofar as the current information has been supplied to the Court. Any grantees,

assignees or successors in interest should contact the Water Master with proof of chain of title.

Acreages and priorities are established in conformity with the evidence taken before the Special Master Any changes of place or manner of use or point of diversion which have been since approved in the manner provided by the Temporary Restraining Order and Special Master's Report shall be recognized and recorded by the Water Master

ADMINISTRATIVE PROVISIONS

I. Without the application of water, the lands described above are dry and and and irrigation is necessary for the production of valuable crops thereon The respective amounts of water stated above to have been appropriated for or used on these lands, are, in each instance, the maximum amount necessary and sufficient for the reasonable and economical irrigation of crops thereon

II. The above-named parties who have appropriated water for irrigation have also used and are entitled and allowed to use water for livestock and domestic purposes, but only in such amounts as may be necessary for watering stock and for domestic purposes. The priority in respect to the use of water for livestock and domestic purposes shall be identical to the priority of that party's irrigation right.

III. The parties, intervenors, grantees, successors in interest and substituted parties, assigns and each of their servants or agents and all persons claiming by, through or under them in or to the water rights or lands above described are, and each of them is hereby, until otherwise ordered, restrained from asserting or claiming, except in this action, any right in or to the waters of the Carson River or its tributaries, or the waters of any of the creeks or streams or other waters mentioned above except in accordance with the rights specified, determined and allowed by this Decree.

All claimants or potential claimants mentioned in the above paragraph are as well hereby, until otherwise ordered by the Court, restrained and enjoined from diverting, taking or interfering in any way with the waters of the Carson River or its tributaries, including creeks, streams and springs, so as to in any way prevent or interfere with the diversion, use and enjoyment of the water of any of the persons or parties as allowed by this Decree, having due regard to the relative priorities and historic practices recognized in this Decree. All claimants or potential claimants mentioned in the above paragraph are hereby enjoined and restrained from taking, diverting or using any of the water allowed to them, in any manner or at any time while this Decree remains in force so as to in any way interfere with the prior rights of any other persons or parties having prior rights under this decree (subject to this Decree's provisions on segmentation of the river) until such persons or parties having prior rights have received for their use the waters hereby allowed to them

IV The quantities of water to be diverted by the owners of the several ditches, through those ditches, on account of the several priorities herein allowed, are allowed subject to the obligations of said owners to divert and use water only at such times as needed and only in such amounts as may be required for actual, reasonably economical beneficial use Rotation, or the combining and exchanging of the use of water between ditches and among users shall be permitted at all times and shall be required whenever necessary in order to obtain reasonable economy in the use of the water of the river or its tributaries, or in order to give each ditch or user a more advantageous irrigation head, provided that such rotations shall not injuriously affect any of the rights determined and allowed by this Decree The Water Master may direct such rotations after consultation with the various interested water users.

V This Decree does not and shall not in any way affect the title to rights in any property other than the rights to the diversion and use of water as herein stated and allowed In the cases where this Decree allows water to be diverted through any ditch by the ditch owner on behalf of another party, the conditions of any contractual relations existing between them are not hereby determined

VI A Water Master shall be appointed by this Court to carry out and enforce the provisions of this Decree and the instructions and orders of this Court. If any proper order, rule or direction of the Water Master, made in accordance with and for the enforcement of this Decree, is disobeyed or disregarded, he is empowered and authorized to cut off the water from the ditch or canal owners who disobey or disregard the order, rule or direction. If such a cutoff should occur the Water Master shall promptly report to the Court his actions and the circumstances surrounding the case.

When the Court deems it necessary, the Court shall authorize the employment by the Water Master of assistants so as to properly carry out the provisions of this Decree and the orders of the Court The term of employment, expenses and compensation of the Water Master and his assistants, the payments and means and methods of securing funds to pay the same, shall be fixed by orders of the Court from time to time. Any person feeling aggrieved by any action or order of the Water Master may, in writing and under oath, complain to the Court, after service of a copy of the complaint on the Water Master. The Court shall promptly review the action or order and make such order as the circumstances warrant

All disputes on the Carson River system involving the existence or ownership of water rights, the distribution of water or the transportation or measurement of water shall first be submitted to the Water Master for determination as a jurisdictional prerequisite to any complaint to the Court for relief.

The Water Master shall establish a file system for the water rights on the Carson system The files will be numbered to correspond to the claim numbers set forth in this Decree and subdivided as may become necessary according to future ownership changes The Water Master must be notified by the parties when title to a water right is changed and proof of the change of title must be provided to the Water Master The Water Master shall not be required to deliver water to any new owner unless this provision is complied with The file system shall be extended to include the Newlands Project farmlands only when the lands are sold or transferred or the water rights are sold or transferred. In each such instance the Water Master shall not be required to deliver water to the new owner until the Water Master's office has been informed of the transfer and proof of title going back to the original United States patent has been supplied

The party in interest shall provide the Water Master with a copy of either the approved application by the State Engineer or this Court's order where requests for changes in the place of diversion, place of use or manner of use are approved. The Water Master is not required to recognize such changes unless and until provided with the order or approved application

VII. Applications for changes in the place of diversion, place of use or manner of use as to Nevada shall be directed to the State Engineer. Any person feeling himself aggrieved by any

order or decision of the State Engineer on these matters may appeal that decision or order to this Court Proceedings for review of a decision or order by the State Engineer must be commenced within 30 days of the rendition of the order or decision

No such appeal proceedings will be heard by this Court unless notice thereof, containing a statement of the substance of the order or decision complained of, and of the manner in which the same injuriously affects the appellant's interests, has been served upon the State Engineer, personally or by registered or certified mail, at his office at the State Capitol within 30 days of the rendition of the decision or order in question. A similar notice must also be served personally or by registered or certified mail upon other persons who are affected by the order or decision. A bond shall not be required unless a stay is requested. The decision of the State Engineer shall be prima facie correct, and the burden of proof shall be upon the party challenging the Engineer's decision. Change of manner of use applications from use for irrigation to any other use and changes in place of use applications shall be allowed only for the net consumptive use of the water right as determined by this Decree.

Applications for changes in the place of diversion, place of use or manner of use as to California or as to both California and Nevada shall be made directly to this Court in accordance with the regular rules of procedure and notice must be served on all affected interests

VIII. The owner or owners of each ditch or canal now or hereafter authorized to directly divert water from the Carson River or any of its tributaries, shall, at his, its, or their own expense, install and maintain in the ditch or canal a reliable, sufficient and easily operated regulating headgate, to be approved by the Water Master, whereby the water diverted into said ditch or canal may be regulated The owner or owners of any such ditch or canal shall have two years from the date of entry of this Decree to fulfill this provision.

Those users who receive water from any particular ditch or canal shall allocate the installation costs of these devices among themselves in proportion of any user's water right acreage to the total water right acreage served by the ditch or canal. In this way the owner or owners of each canal or ditch shall receive proportionate contribution from all those users who benefit from the use of the ditch or canal, whether by use of the direct flows or by use of the return flows. Upon failure of any owner or owners of any such ditch or canal to install these devices within the prescribed time, the Water Master, upon ten days' notice, may cut off the water from any such ditch or canal until the required devices are installed and maintained. Upon the failure of any user to contribute his fair and proportionate share of the cost to the owner or owners of any canal or ditch, the Water Master, upon ten days' notice, may cut off that user's water until the contribution has been made.

IX. The stored water of any reservoir may be turned into and carried in the channel of any natural stream and mingled with the natural waters and diverted therefrom for the proper uses of the persons or parties entitled thereto. The Water Master, upon timely notice, shall so regulate the headgates along the streams and do and direct such other things as may be needful to transport such stored water and deliver the same to the person or persons entitled thereto. All persons are hereby prohibited from in any way interfering with any such stored water while the same is being legally carried to the persons or parties entitled thereto.

X. No user entitled to the use of water under this Decree shall be allowed to divert more than 40% of his total entitlement in any one calendar month.

XI. Whenever any of the parties hereto, or their successors or assigns as the owners of any of the water rights hereby fixed and allowed, is not receiving the amount of water to which he or they are entitled under this Decree, he or they may request the Water Master to distribute the water in accordance with the terms of this Decree, and the Water Master, either personally or by his assistant, may thereupon enter the lands of any and all parties and persons having rights designated in this Decree and of their successors in interest, and shall regulate their, or any of their headgates, ditches and other works used for the diversion and application of such waters so as to apportion the waters as provided in this Decree.

XII Each party shall bear his or its own costs herein incurred.

XIII The Court hereby expressly reserves jurisdiction to modify, amend, eliminate, add to or change any provision of this Decree.

DONE IN OPEN COURT this 28th day of October 1980

Appendix 3
SOURCES OF FURTHER INFORMATION

This appendix presents some suggestions for further reading on subjects covered in this atlas. Background material used to prepare the atlas came primarily from information collected by the Department as part of its work over the years on the interstate water allocation issues. The following material is not a complete bibliography, but instead is intended to provide the reader with a listing of some of the primary information sources and some of the interesting general references.

Historical References

A History of the Comstock Lode, 1850-1920. Grant H Smith University of Nevada Bulletin, Vol. XXXVII, No 3, July 1, 1943, Geology and Mining Series No 37. Publication of the Nevada State Bureau of Mines and the Mackay School of Mines.

A History of the Comstock Mines; Mineral and Agricultural Resources of Silver Land Dan DeQuille (William Wright). F Boegle, Virginia City, Nevada 1889

Conflict on the Carson, A Study of Water Litigation in Western Nevada. Grace Dangberg. Carson Valley Historical Society, Minden, Nevada. 1975

Mines and Mineral Resources of Alpine County, California. William B Clark. California Division of Mines and Geology County Report 8 Sacramento. 1977.

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Final Environmental Impact Statement for the Newlands Project Proposed Operating Criteria and Procedures. Prepared by URS Corporation for the U.S. Bureau of Reclamation, Mid-Pacific Regional Office. December 1987.

Geohydrology and Simulated Response to Ground-Water Pumpage in Carson Valley, A River-Dominated Basin in Douglas County, Nevada, and Alpine County, California Douglas K. Maurer. U.S. Geological Survey Water-Resources Investigations Report 86-4328. Carson City. 1986.

Ground-Water-Quality Assessment of the Carson River Basin, Nevada and California, Analysis of Available Water-Quality Data Through 1987. U.S. Geological Survey Open-File Report 89-382. Washington, DC. 1989.

Lake Lahontan Geology of Southern Carson Desert, Nevada R.B. Morrison. U.S. Geological Survey Professional Paper 401. Washington, DC. 1964

Truckee River Atlas Department of Water Resources. Sacramento. June 1991.

Water and Related Land Resources, Central Lahontan Basin, Carson River Subbasin, Nevada-California, Special Report, History of Flooding, Carson Valley and Carson City Watershed. Report prepared by USDA Nevada River Basin Planning Staff and U.S Soil Conservation Service. Carson City 1973.

Water and Related Land Resources, Central Lahontan Basin, Nevada-California. Report prepared by USDA Nevada River Basin Study Staff in cooperation with Nevada Department of Conservation and Natural Resources, University of Nevada, Resources Agency of California, and USDA. Carson City. July 1975.

Water Rights and Litigation

Lake Tahoe, the Truckee River, and Pyramid Lake; The Past, Present, and Future of Interstate Water Issues John Kramer Pacific Law Journal, Volume 19, No 4, July 1988.

Reserved Water Rights Settlement Manual Peter W. Sly. Island Press, Washington, D.C. 1988

Legal References — Constitution and Statutes

California-Nevada Interstate Compact, California Water Code Sec 5976 and Nevada Rev. Stat Sect. 538 600 (As ratified and approved by the legislatures of both states, but not consented to by Congress)

California Wild and Scenic Rivers Act, California Public Resources Code Sec 5093.50 et seq

Endangered Species Act, 16 U S C Sec. 1531 et seq.

Fallon Paiute Shoshone Indian Tribes Water Rights Settlement Act of 1990, Title I of Public Law 101-618, 104 Stat 3289

Truckee-Carson-Pyramid Lake Water Rights Settlement Act, Title II of Public Law 101-618, 104 Stat. 3289.

Reclamation Act of 1902, 32 Stat. 388, 43 U S C Sec. 371 et seq.

Legal References — Judicial Actions

Anderson v Bassman, 140 F 14 (U.S.D.C., N.D. Cal. (1905)). (The Anderson-Bassman Decree.)

In the Matter of the Determination of the Rights, Based upon Prior Appropriation, of the Various Claimants of the Waters of the West Fork of Carson River and its Tributaries, Superior Ct , Alpine County (no docket number; Decree dated Nov 21, 1921, endorsed filed Dec 10, 1921) (The Price Decree)

National Audobon Society v Superior Court of Alpine County, 33 Cal. 3d 419, 189 Cal Rptr. 346, 568 P.2d 709 (1983) (Initial exposition of application of California's public trust doctrine to water rights)

Pyramid Lake Paiute Tribe of Indians v. Hodel, No S-87-1281-LKK/JFM, U.S.D.C., E.D Cal. (1987). (Repair and operation of the dam at Lake Tahoe.)

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**Union Mill & Mining Co. v. Dangberg, 81 Fed. 73 (U.S.D.C , D. Nev. (1897)).*

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United States of America v. Truckee River General Electric Company, Civ. No. S-643-LKK (E D Cal. 1915). (Control of dam at Lake Tahoe for the Newlands Project.)

Winters v United States of America, 277 U.S. 564 (1908) (Establishment of the doctrinal basis of federal indian reserved water rights)

*These three cases are samples of the early disputes among Comstock mining and milling interests and farmers in the Carson Valley.

Copies of this report at $5.00 each may be ordered from:

State of California
Department of Water Resources
Post Office Box 942836
Sacramento, CA 94236-0001

Make checks payable to Department of Water Resources.
California residents add sales tax.